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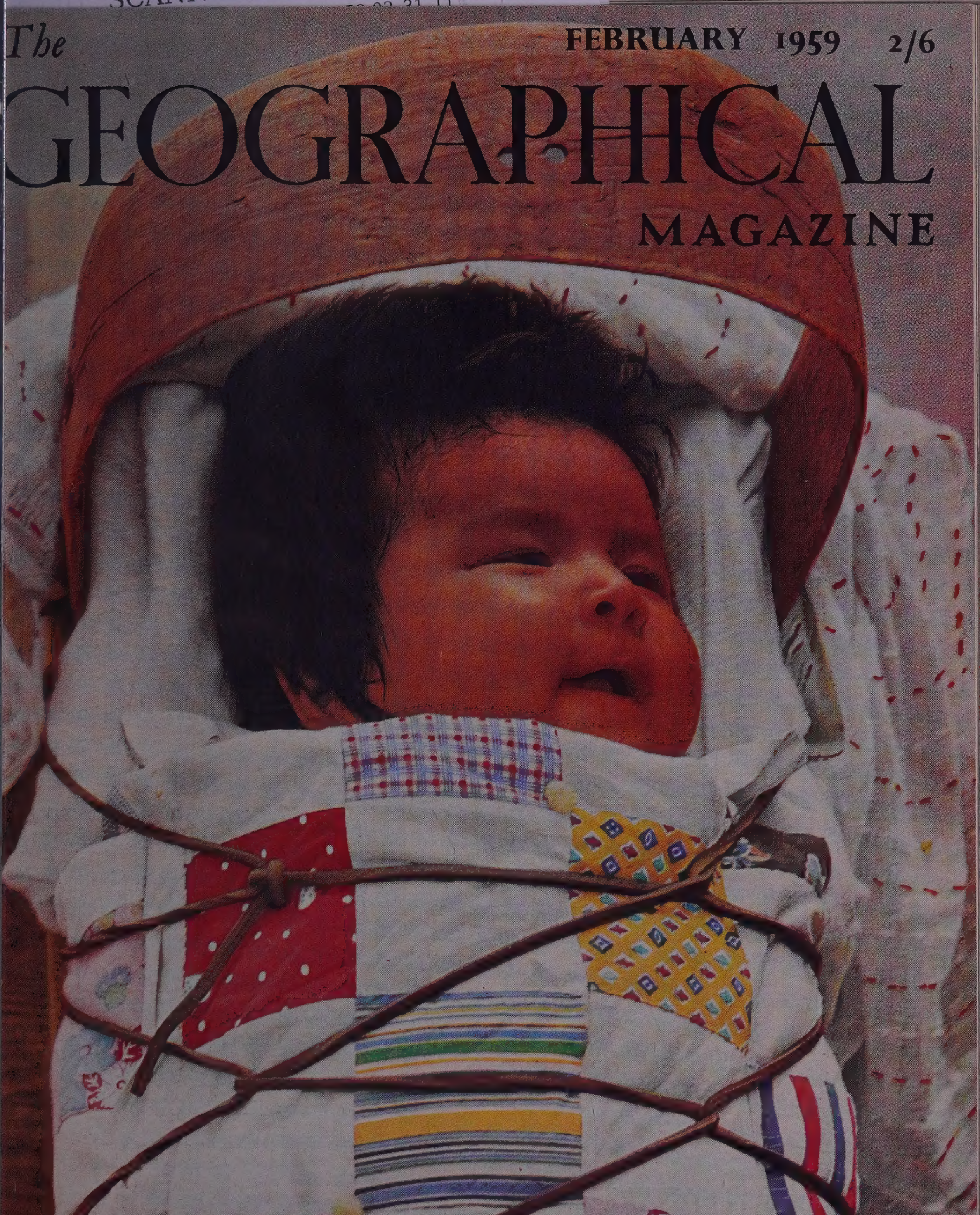

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An Australian in Netherlands New Guinea

by DONALD F. THOMSON, O.B.E., D.Sc.

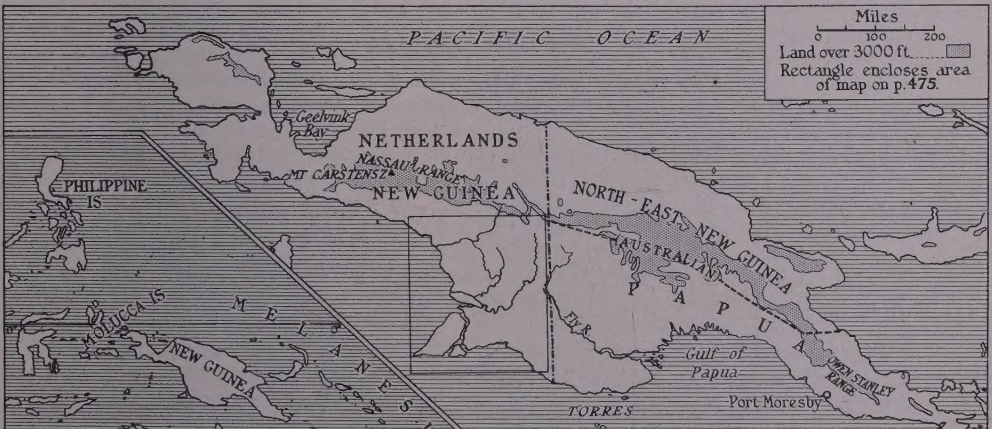
Dr Thomson, who heads the Department of Anthropology at Melbourne University, has spent most of his working life in the field in Australia and New Guinea. For work in the Cape York Peninsula he was awarded the Cuthbert Peek Grant and the Patron's Medal by the Royal Geographical Society. Indonesian claims bring Netherlands New Guinea frequently into the news: Dr Thomson's account of his experiences in that territory places it in perspective from the Australian point of view

New Guinea, the great island which lies just north of Australia, has been likened in outline to a huge turtle; its head, reinforced by the Arfak Mountains, looking westwards, its body forming the main bulk of the island with a high mountain ridge for spine, and its tail, comprising the Owen Stanley Range, projecting eastwards into the Pacific Ocean. It is about 1500 miles in length, with a maximum width of about 500 miles and a total area of some 347,000 square miles: nearly four times as large as Great Britain. Only a narrow and shallow seaway that can be crossed easily in a canoe separates it from the Cape York Peninsula in Australia.

The political history of New Guinea was summarized by Sir Harry Luke in his article on "Split Islands" in the December, 1957, number of this Magazine. Here I need only say that its division into two parts at the 141st meridian east of Greenwich dates from 1828, when the Dutch, long established in the neighbouring Moluccas, annexed the western part; and that the eastern part is administered by Australia.

My own interest in New Guinea goes back many years, to the time when I was doing scientific field-work on Cape York Peninsula. Here I was much interested to find an admixture of strange plants, mammals, birds and reptiles, which in some places merely intruded upon, but in others dominated the scene, and showed unmistakable evidence of having originated in New Guinea. Such were the splendid tropical Pitcher-plants (*Nepenthes*)—exotic, fantastic and quite foreign to my own experience of Australia. Then there were the Cuscus and Cassowary, to which I shall refer later; and among reptiles *Chondopython viridis*, a snake hitherto unrecorded in Australia, coloured a brilliant unreal green with a single line of white spots along its back.

Equally striking was the evidence of the infiltration of racial, as well as of cultural, traits among the Aboriginal tribes of this



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region, which must have been introduced from New Guinea by way of Torres Strait and swept down both sides of the Peninsula, leaving the culture of the people of the central highlands of Cape York untouched. Not the least interesting of these traits was the drum, with tympanum of lizard-skin and carved crocodile-jaws; drums being quite unknown to other Australian Aborigines, who beat time for dance-rhythm with two boomerangs used as clappers or with simple sticks. In this case the drums accompanied the virile and spectacular cults of masked dancers for which those I encountered, years later, in southern and western New Guinea undoubtedly formed the pattern.

My interest in New Guinea was intensified by meeting, more than once, on Thursday Island in Torres Strait, a man who said he was a Bird-of-Paradise hunter living in Netherlands New Guinea. On the last occasion on which I heard from him he told me that he was holding Bird-of-Paradise plumes to the value of more than £8000 which were, however, unsaleable because of the prohibition on the sale of plumes in accordance with international agreement. Still later, I learned that he had been seen, standing up in a native canoe, stark naked, singing as he headed for the open sea. The solitude, the long fight with the jungle, the frustration of finding that the hard years were wasted, had their effect. He was never seen again.

This frustrated trader was among the last of a long line who for many centuries represented almost the only contact that the inhabitants of Western New Guinea had with the outside world: a desultory trade in certain raw materials, notably in Bird-of-Paradise plumes. When I visited remote parts of the country during World War II, offerings of Bird-of-Paradise plumes were brought to me, the bodies of the birds expertly skinned, smoke-dried and stored in cylinders of bamboo, which the natives brandished to attract our attention. These must have been a staple article of trade with such visitors by sea as the Malays who, coming from the Moluccas, established trading-posts on the western coast.

The Malays called the natives "Papuans", a name which refers to their woolly hair. Such hair is characteristic of two of the three basic racial stocks composing the population of New Guinea. The earliest arrivals were the Negritos, who still survive as a pure stock in remote mountain areas of Netherlands New Guinea. They are closely related to other pygmy races inhabiting the countries fringing the Indian Ocean—the Negritos of the Andaman Islands in the Bay of Bengal and the Sakai or Senoi of the Malay Peninsula—as well as certain mountainous areas of the Philippine Islands. All these people are characterized by their small stature and by the possession of dark skins and close woolly—as opposed to curly or frizzy—hair.

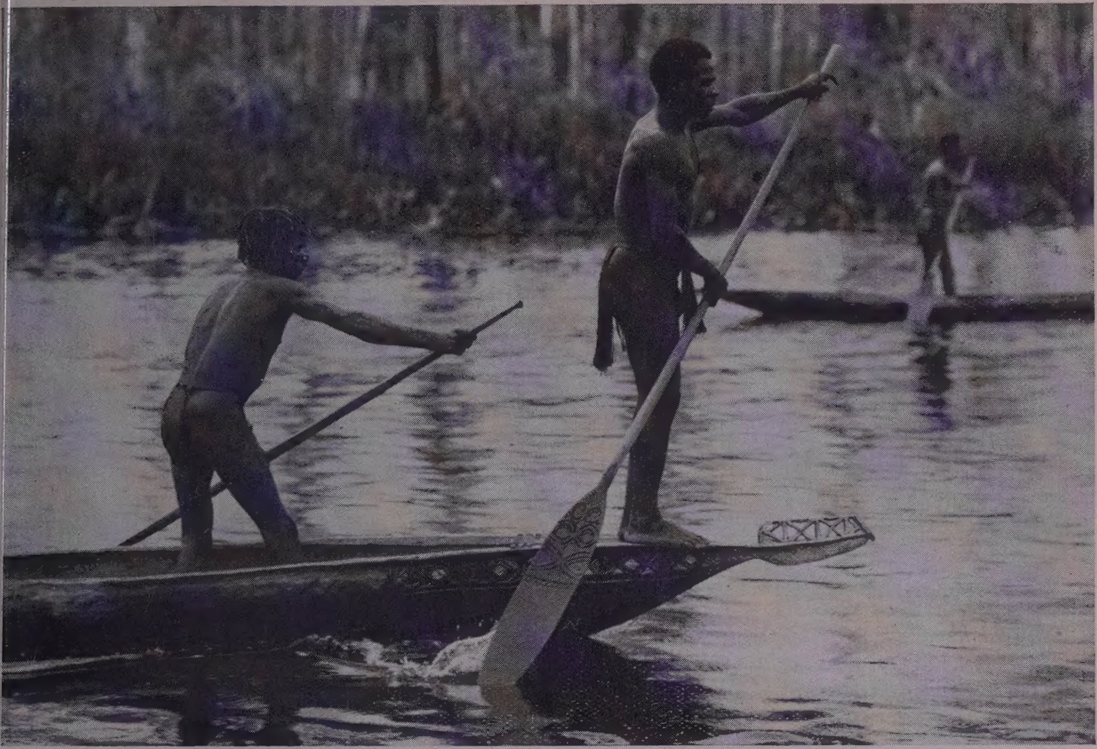
Nowadays, however, the name Papuan is applied to people of a distinct racial stock which, though showing evidence of Negrito admixture, is taller and of more robust build. This stock is dominant among the population in the south, especially in the low-lying coastal regions.

The third important group in Netherlands New Guinea are the Melanesians. Their stronghold is on the northern and eastern coasts of the island and their closest racial affinities lie to the east in the Pacific; but they have penetrated far westwards, having established themselves along the north coast as far as Geelvink Bay and being found also in villages along the southern coastline.

Physically the Melanesians are taller than the Papuans and have round, rather than long heads as do the latter; while their hair is frizzy instead of woolly and they have a lighter skin-coloration, often showing a copper tinge.

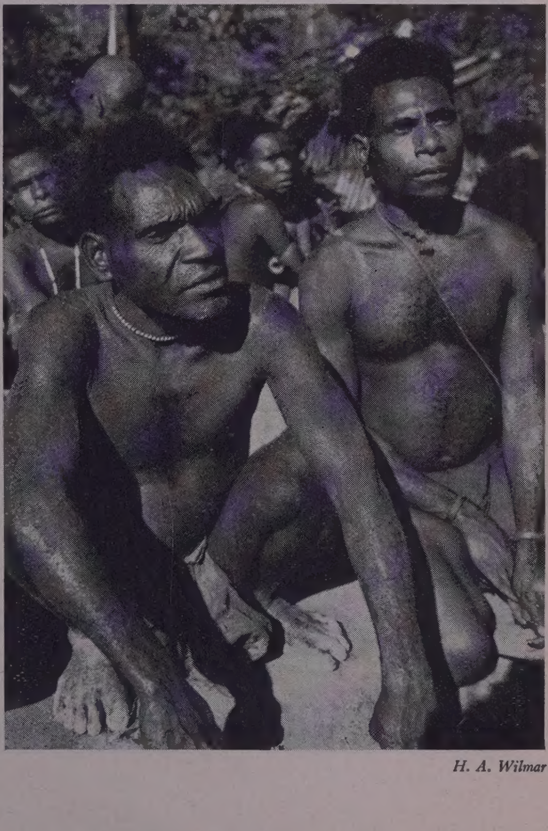
Unlike the Papuans they are a sea-faring people and skilled in the making of pots. The people comprising the Papuan element of western New Guinea were not potters but either obtained their pots by trade with the predominantly Melanesian people to the east, or learned the art from them. On the south-eastern coastline, near Port Moresby in Australian territory, where the climate is dry, there was a lack of vegetable foods. In the low-lying coastal areas of south-western New Guinea, however, large quantities of sago palms grow; and production of sago by the Papuans had reached such a stage in the delta of the Fly River that a great system of exchange—part economic, part ceremonial—grew up, long before the coming of the white man, in which sago was traded for cooking-pots. The annual trading-voyages were called *hiri*. This trade the Melanesians conducted in sea-going outrigger canoes, called *lakatoi*, fitted with huge crab-claw sails.

During the early part of World War II, while serving as a Flight-Lieutenant with No. 11 General Reconnaissance Squadron, R.A.A.F., I made a memorable voyage along the southern coast of Papua in one of these big sea-going canoes. "Memorable" is perhaps an understatement, because though the craft was expertly handled, it rolled heavily in a beam sea and its buoyancy was such that



All photographs, except four, from the author

The people of Netherlands New Guinea comprise representatives of the three main racial stocks found in the rest of the island—Papuans, Negritos and Melanesians—which are much intermingled. The name "Papuan" refers to the woolly hair characteristic of the first two groups, but is nowadays usually applied to the tall, stalwart people who inhabit areas near the coast and along the low-lying coastal rivers. (Right) *Their woolly hair and a common Papuan facial type are illustrated in this photograph; while the fine physique of the river-dwellers is exemplified* (above) *by these men in the long, highly carved dug-out canoes which they propel with broad-bladed paddles*



H. A. Wilmar

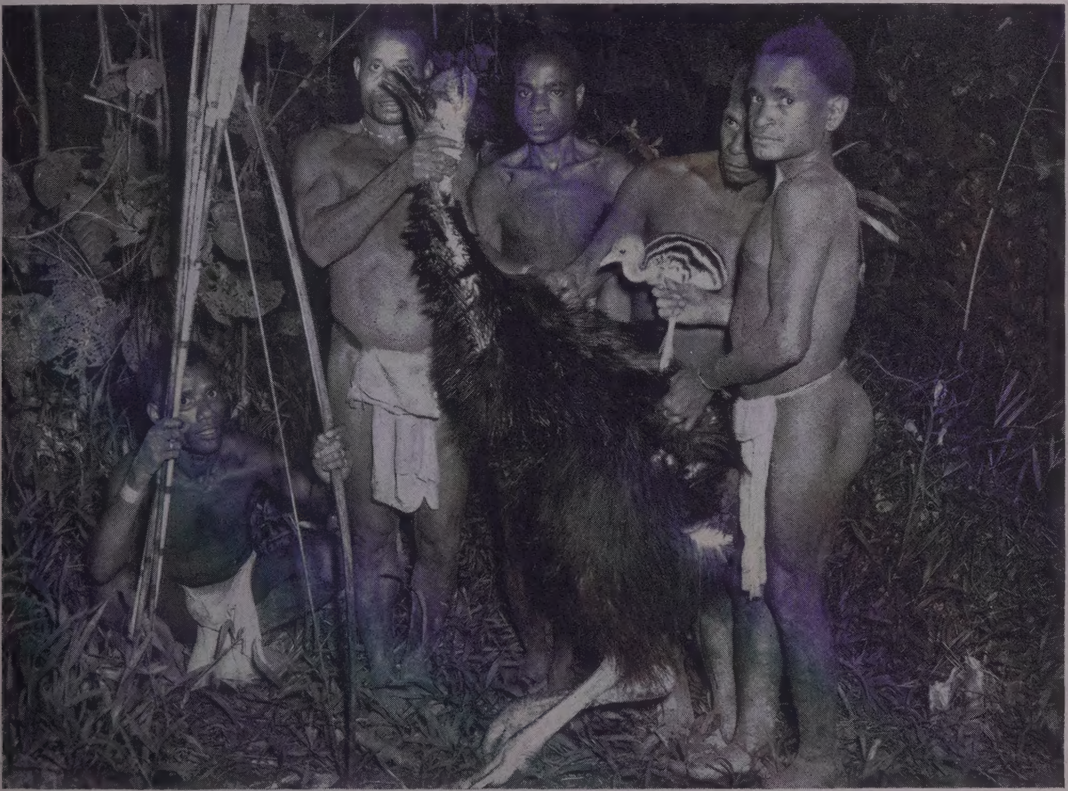
Both photographs from De Bergpapoea's Van Nieuw-Guinea, *C. C. F. M. Le Roux*

In the highlands of Netherlands New Guinea live Negrito pygmy people whose average stature is about five feet. They still survive as a pure stock in remote mountain areas of the country, such as (above) *the valleys north of the Nassau Range.* (Below) *A Negrito pygmy sharpens his stone knife*

as it rose with the swell, every joint—secured only with rope or rattan lashings—worked freely and the craft seemed to sport and cavort like a playful dolphin. Mindful of an earlier adventure with the sea-farers of eastern Cape York in which our outrigger canoe swamped off a river estuary in a sea infested with sharks and crocodiles, I was relieved to end the short but exciting voyage. Even our take-offs and landings with the flying-boats in nasty seaways, uncharted and unmarked by buoys, were tame compared with this voyage in a Melanesian canoe in deep water.

Sea voyages, however, present no difficulties comparable with travel in the interior. Much of Netherlands New Guinea is still unexplored—and with good reason. From the low-lying sago-swamps of the west and south-west, with their wide, sluggish, brackish river-estuaries fringed by almost impenetrable mangroves, the land rises to dense, tropical rain-forests and then to the high, rugged mountain ridge already mentioned that runs down the centre like a backbone for almost the whole length of the island. This range, often snow-capped, with its formidable, bare rocky slopes and deep passes, reaches its maximum height and development in Netherlands New Guinea, where, in the Nassau mountains, at Mount Carstensz, it attains an altitude of 16,000 feet. Between this great mountain-summit and Mount Idenburg the mountain-tops are ice-covered, with forbidding, vertical faces, some of which are reported to have a sheer drop of fully 10,000 feet.

Travel for any distance inland in unexplored Netherlands New Guinea is thus a matter of great difficulty, discomfort and hardship. Rain falls almost incessantly in the swamps and in the tropical forest-belts, for a considerable part of the year. The atmosphere is like a Turkish bath, hot and steamy, and mosquitoes and leeches abound. The trunks of the tall forest trees are devoid of limbs for great heights but their heads, surmounted by dense leafy branches, intertwined with vines and lianas, form a canopy overhead. Within the forest hangs a per-



A Cassowary shot with a bow and arrow. The Cassowary, an ostrich-like bird standing some five feet high, inhabits the steaming jungles of New Guinea. Some tribes tip their spears with the razor-sharp claw of its long inner toe; they also transfix their noses with pieces of its bones

H. A. Wilmar

petual gloom. This is the home of the Cassowary, a bird that loves the shadows, the twilight of the jungle, whose deep brown eyes cloud and become milky if exposed to strong sunlight. Here also lives the Cuscus, of which there are several species. The Cuscus is a pouched mammal of arboreal habits, closely related to the Australian Opossums, and belongs, with these animals, to the group of the Phalangers. It has a dense, close fur, very short ears, large, prominent golden eyes and a strongly prehensile tail, bare at the tip. The Cuscus builds no nest, but curls up in the high branches of tall jungle trees in dense shade. It is a very characteristic animal of the New Guinea jungle, much sought after by the natives for food; and its fur is prized for use in ceremonial head-dresses.

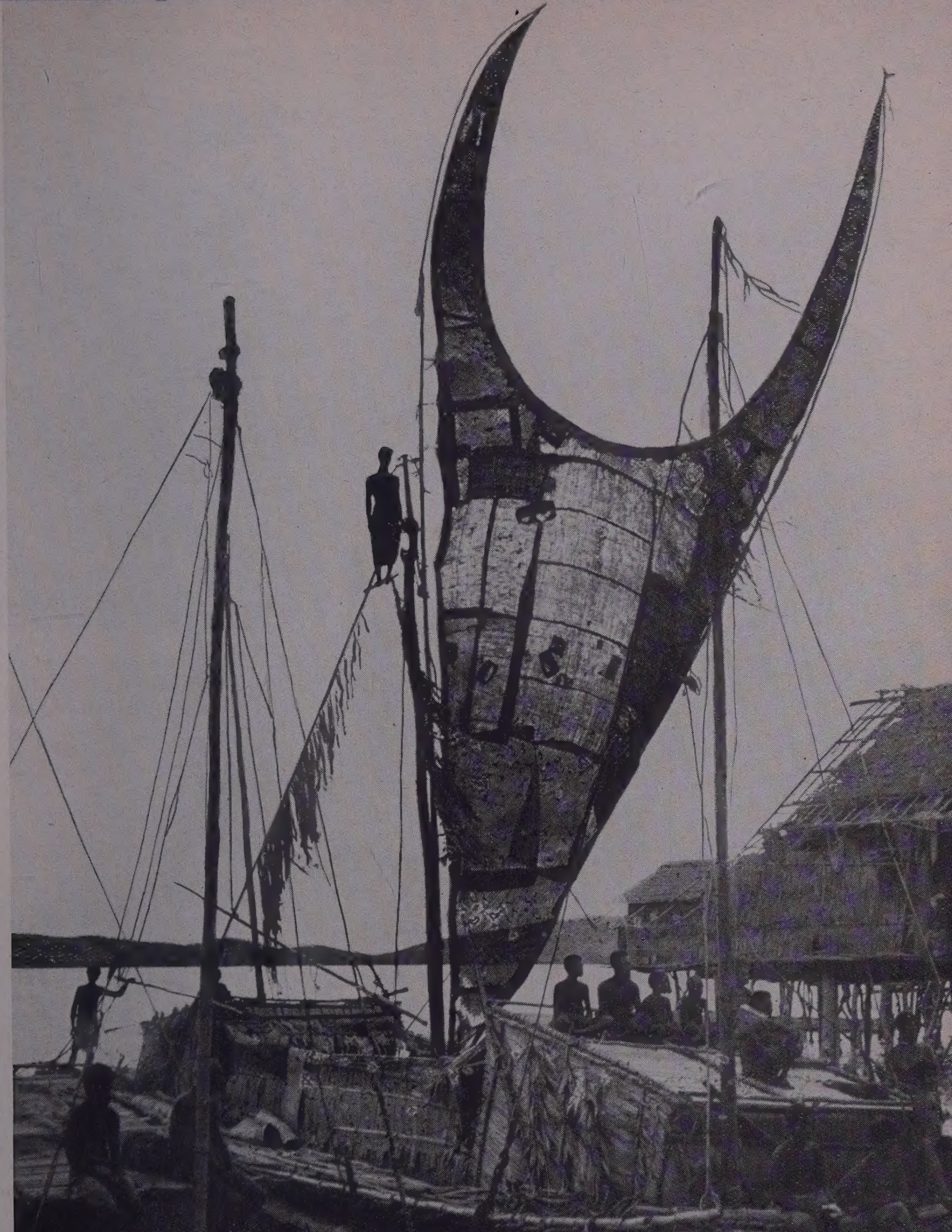
With the Japanese advance southwards in World War II Australia was obliged to garrison the southern part of Netherlands New Guinea in order to safeguard her supply-lines through the Torres Strait and protect her northern approaches. In 1943 I was seconded to First Australian Army for special service on forward reconnaissance behind the Japanese lines in Netherlands New Guinea and was entrusted with the task of leading forward patrols, the most important of which was a journey of exploration to endeavour to discover an inland connection between the watersheds of the Digoel and Eilanden Rivers by way of the vast unexplored swamplands of the Upper Oba River.

This almost featureless morass extends west and north over a huge area. For all we knew it might already be occupied by the Japanese, who had been somewhere on the northern watershed for almost two years. From previous patrols I learned that floating islands of vegetation—sometimes half an acre in extent—were a formidable obstacle to passage through it by water. The advice to break them up with explosives seemed to me fantastic and I planned a different method of approach: to befriend the swamp-dwellers in their scattered island villages and to employ them, their water-craft and their techniques of travel, developed through many generations on their head-hunting raids.

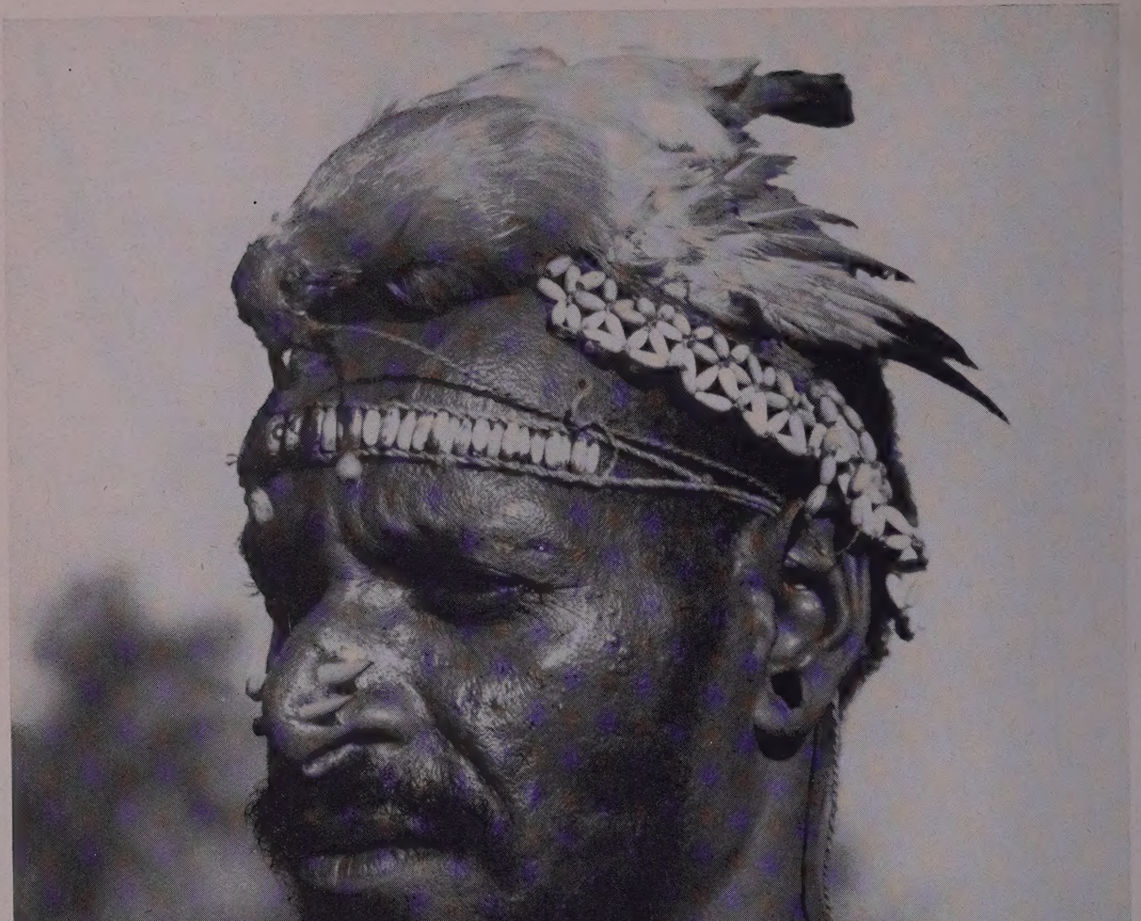
From our starting-point at Mappi Post on the Digoel, therefore, I took only the lightest equipment and a twenty-foot plywood launch, making use of a heavy launch, the *Sylvia*, to tow this and transport us and our gear as far forward as possible towards Japanese-occupied territory.

After two days of driving against the strong

Scattered along the coast of Netherlands New Guinea are settlements of Melanesians who have migrated westwards from what is now Australian territory. Here women returning from their gardens in the jungle show the plentiful, frizzy hair which denotes an infiltration of Melanesian blood



A lakatoi *or sea-going outrigger canoe with distinctive crab-claw sail, near Port Moresby. In them the Melanesians of Australian New Guinea undertake annual voyages called* hiri*—part economic, part ceremonial—westwards far along the coast, to exchange the cooking-pots made by them for sago*



A head-hunter of the swamps of the Upper Oba River in southern Netherlands New Guinea, the source of the Wildeman River which drains into the Eilanden. He is wearing a Bird-of-Paradise head-dress. Nose-ornaments of sharpened Cassowary-bone are greatly favoured by the local head-hunting tribes

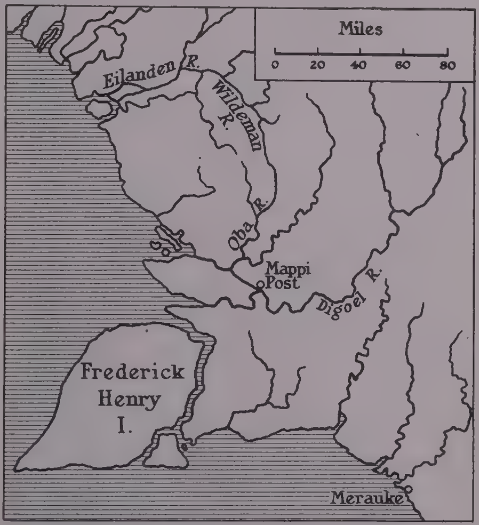
A fleet of big dugout canoes, some over sixty feet in length, in the vast trackless marshes of the Upper Oba River: isolated small islands provide the only dry land and canoes the only transport. Similar canoes were used in the expedition led by the author through this area in World War II

current we reached the swamps of the Upper Oba. On their fringe I established a shore camp for our party, comprising Sergeants Egan and Ritchie of the R.A.A.F. and Sergeant Kapiu from Bardu Island in Torres Strait, with eight other Torres Strait islanders enlisted as 'native troops'.

Sending the *Sylvia* back to the Digoel, I managed to assemble more than sixty of the local swamp-dwellers and with them twenty of their great canoes, each about sixty feet long and capable of carrying half a ton. These were loaded with sufficient sago to feed the crews for two weeks, supplemented by tobacco, rice and some tinned meat. I issued each member of each crew with a big *parang* (cane-knife) which they were to keep when they had cut through the barriers and let me into open water.

We pushed northwards through the swamps, driving the canoes in single file to form a lane for the plywood launch. Apart from the leeches and mosquitoes, the heat was intense and the humidity appalling. When our way was blocked by dense barriers of floating weed that proved impassable even to the canoes, we drove them ahead as far as we could and then the whole party leapt overboard into the water, slashed at the masses of floating plants with the great knives and rolled the barrier away—our backs braced on one side of the boat, our feet on the other—until a narrow opening was made into which we thrust the bow of the canoe. In this

For the position of this area see map on p. 467



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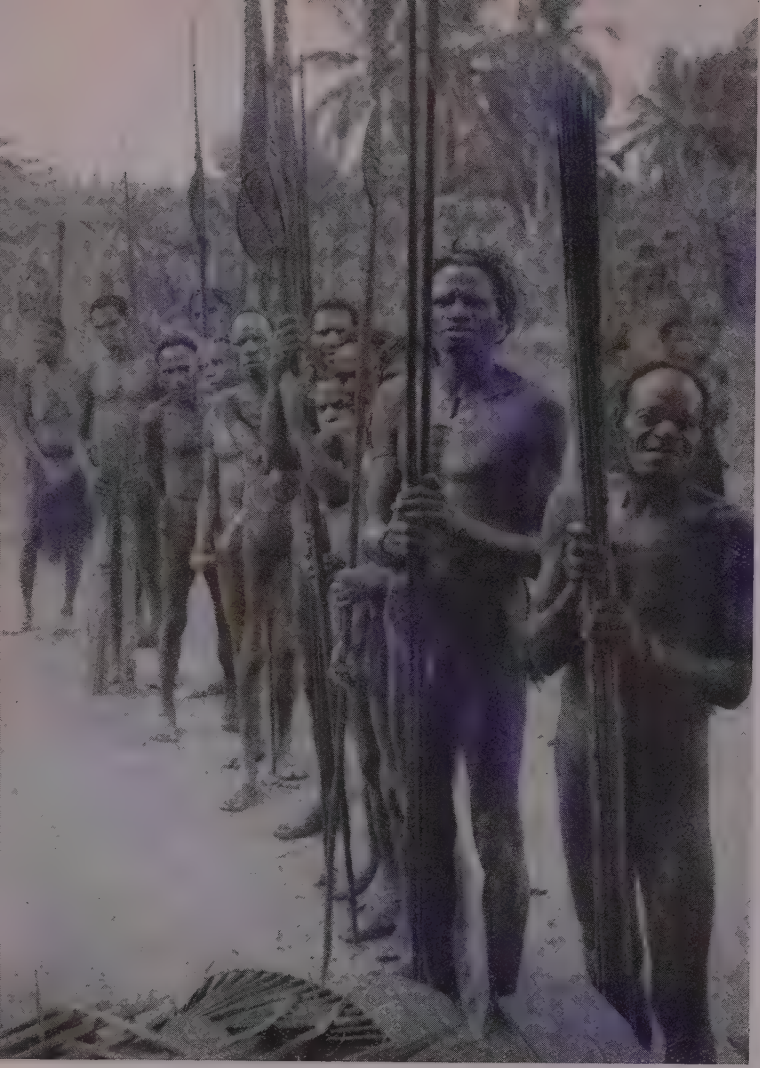


Warriors of the swamp-lands of the Upper Oba in Netherlands New Guinea carrying arrows with needle-fine points and elaborately carved ceremonial spears, barbed and serrated and up to twelve feet long. The tips are made of Cassowaries' claws

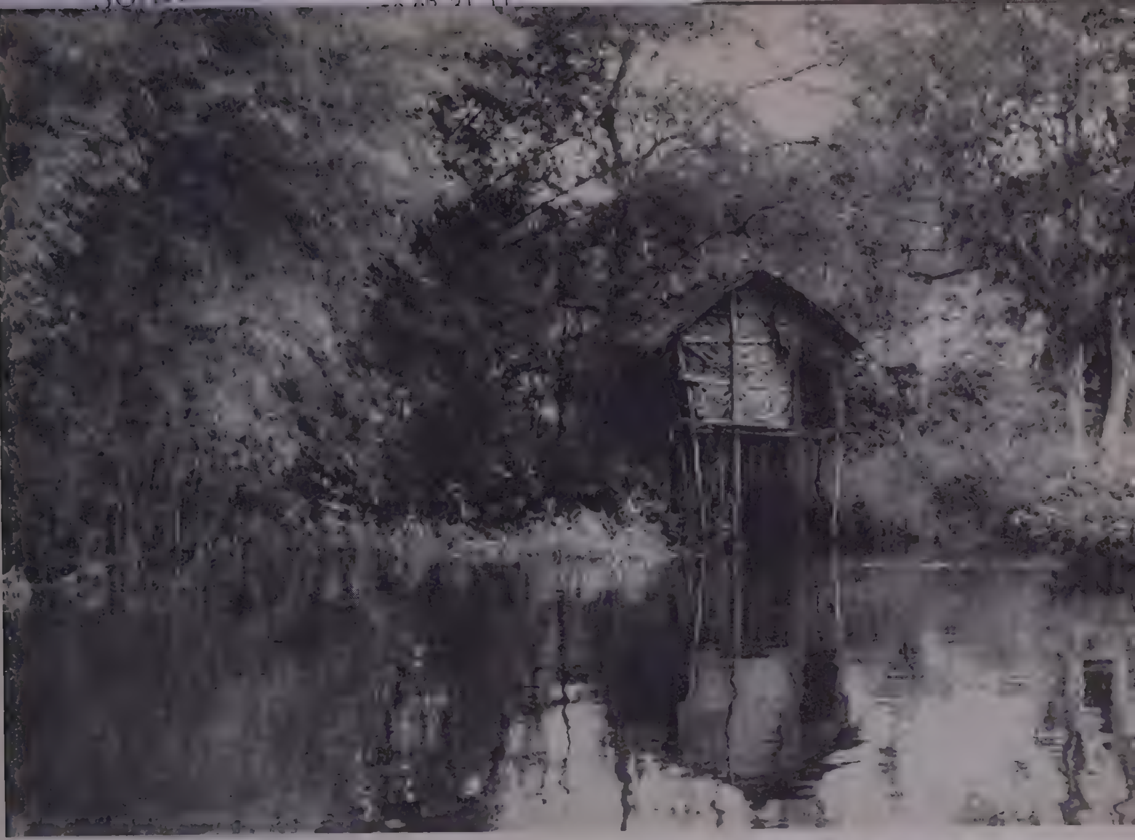
manner, laboriously, sometimes spending many hours in the water, sometimes struggling for more than a day with a single floating island, we cut our way gradually forward.

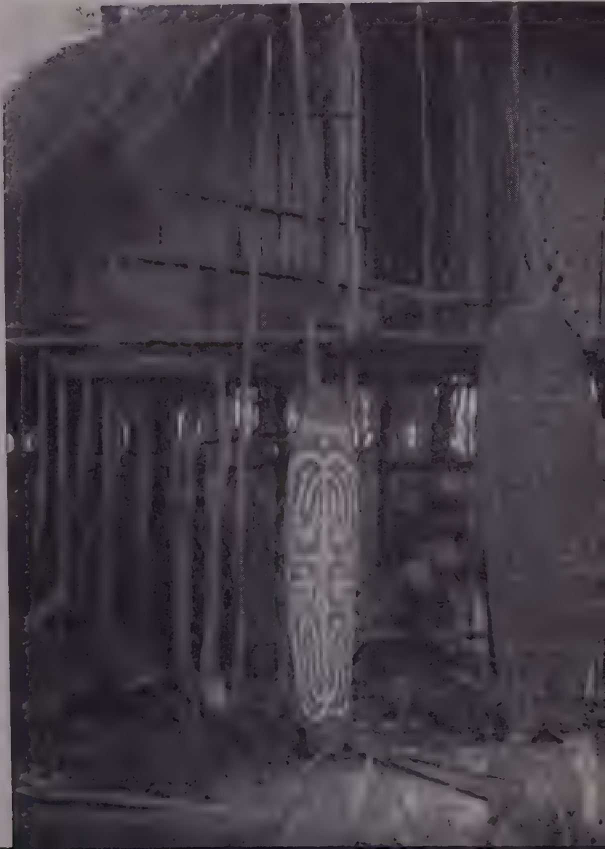
At last, when we were very close to despair, we noticed, as we hacked through one great mass of weed, that the water was moving—though very slowly—and that it was moving towards the north! This meant that open water lay ahead at last and with it the possibility of emerging into the channel of the Wildeman River, a tributary of the Eilanden.

As soon as we reached the Wildeman I felt obliged, since Japanese-occupied territory was now so close, to pay off the head-hunters who had become our trusted allies. I hoped they would collect no heads with their new parangs on their way home! Before they set out in their canoes I bought two of the biggest of these, lashed the hulls together, built a platform of split bamboo-cane between them and on this erected a shelter of palm-leaves. Then, for our journey downstream, we loaded the hulls to their limit with drums of rice, petrol and our most valued stores. Finally, with Sergeant Egan's wireless set and charging-motor aboard and four Bren guns mounted, our 'houseboat' was complete.

The course of the Wildeman, we found, was very deep—soundings often showed no bottom at fourteen fathoms—and great jungle trees grew right to the water's edge. There were no villages here, but only isolated houses scattered along the watercourse and built either in trees or on stilts at the water's edge, so that the inmates could get warning of an approach by head-hunters and have a chance to escape.

Below the junction of the Wildeman with the Eilanden River the stream grew wider and the natives more numerous. But they were evidently suspicious. We saw no women or children, only men—always a bad sign. They watched us ceaselessly from the banks, posting lookouts on the tops of tall trees. Spiked on saplings in the jungle beneath were fresh human heads, reeking with blood and putrefying in the gloom. The natives possessed large numbers of long, narrow dug out canoes which they stationed at intervals, warning one another of our approach by splashing with their broad-bladed paddles. Sometimes one of the canoes would come up to us, the paddlers poised high on the gunwale so that they could abandon the craft at the slightest movement on our part. As they drew near, tense and rigid, they cried aloud "*Sabioh! Sabioh!*"—a word that seemed to mean "friend". At the same time they held aloft the cylinders of bamboo, each contain-





Head-hunting is endemic among the tribes along the Upper Oba, Wildeman and Eilanden Rivers. (Above) *A typical house on the Wildeman, raised on long piles or stilts. The inhabitants of this region live in a state of constant terror. They lead furtive lives in scattered houses close to the water's edge where they can see or hear the approach of an enemy; then they drop into the jungle and hide in the dense thickets of bamboo.* (Right) *A head-hunter's retreat on the Eilanden River, with human skulls hanging in front of the house-door like a bunch of grapes. On each side are ceremonial shield-shaped objects of soft wood carved with designs that are presumably totemic* ing a single Bird-of-Paradise skin, which I have already mentioned.

But we did not know whether they were actually in contact with the Japanese or not. So I took the precaution of tying the 'house-boat', carefully camouflaged, close to the jungle-edge in the daytime, with watching-posts on the bank overlooking the river. We lay behind the guns so that we could ambush any Japanese patrol coming upstream; and at night we pushed our craft out and floated silently downstream in the darkness.

Lower down the river the natives possessed knives and axes which they had obviously got from the Japanese. I therefore established an outpost and left Sergeant Egan in charge of this, with the native troops. In their jungle hide-out they could see the approach of any Japanese and get a message away. Then, taking Sergeants Ritchie and Kapiu in the plywood launch, I set off to reconnoitre the estuary of the Eilanden.

Early one morning, as we were breaking camp on a narrow strip of beach close to the launch, Ritchie and I were looking over a map when the natives crowded around us, as they were accustomed to do to satisfy their curiosity. In other circumstances I would never have allowed this; but here, in enemy-occupied territory (the nearest Japanese headquarters were in fact only twenty miles away), I had had to take the risk of living in their villages. Suddenly we realized—too late—that the women and children had vanished and we were overwhelmed by the weight of attack when two hundred men fell on us with flailing knives and axes.

None of us wore badges of rank; yet the natives knew that I was the leader, for they concentrated their attack on me and I was wounded three times before I could use my tommy-gun. Sergeant Ritchie was cut down in front of me by a sweep of a great steel axe. I received a glancing blow on the side that broke three ribs and dazed me. As I put my hand on the ground to get up, a native swung an axe high over my head—probably intending to reach the brachial plexus for the head-hunters, being good anatomists, aim at this to disable their victims and save the skull! The blow just missed my head but split my left hand between the third and fourth fingers up to the wrist. Another heavy blow struck a deep wound in my shoulder, luckily the left.

The very smallness of our party was in our favour. After the first onslaught the attackers could not distinguish us in the *mêlée*. I was fortunate in being able to get to my feet and also in finding that, although I had lost the use of my left shoulder and arm, I could still lift my left elbow onto the left hip and, resting it there, could fire the tommy-gun. I emptied the magazine. In a few minutes there was not a native in sight.

My next problem was to start the launch. Ritchie was severely wounded in the leg, Kapiu had a nasty axe-wound at the back of the neck. To my relief neither was bleeding badly. With only one hand I could manage the throttle or the choke, but not both simultaneously. At last, however, we got the launch under way and returned upstream to Egan's hide-out. Merauke, our own headquarters, was about 200 miles distant by the nearest practicable route.

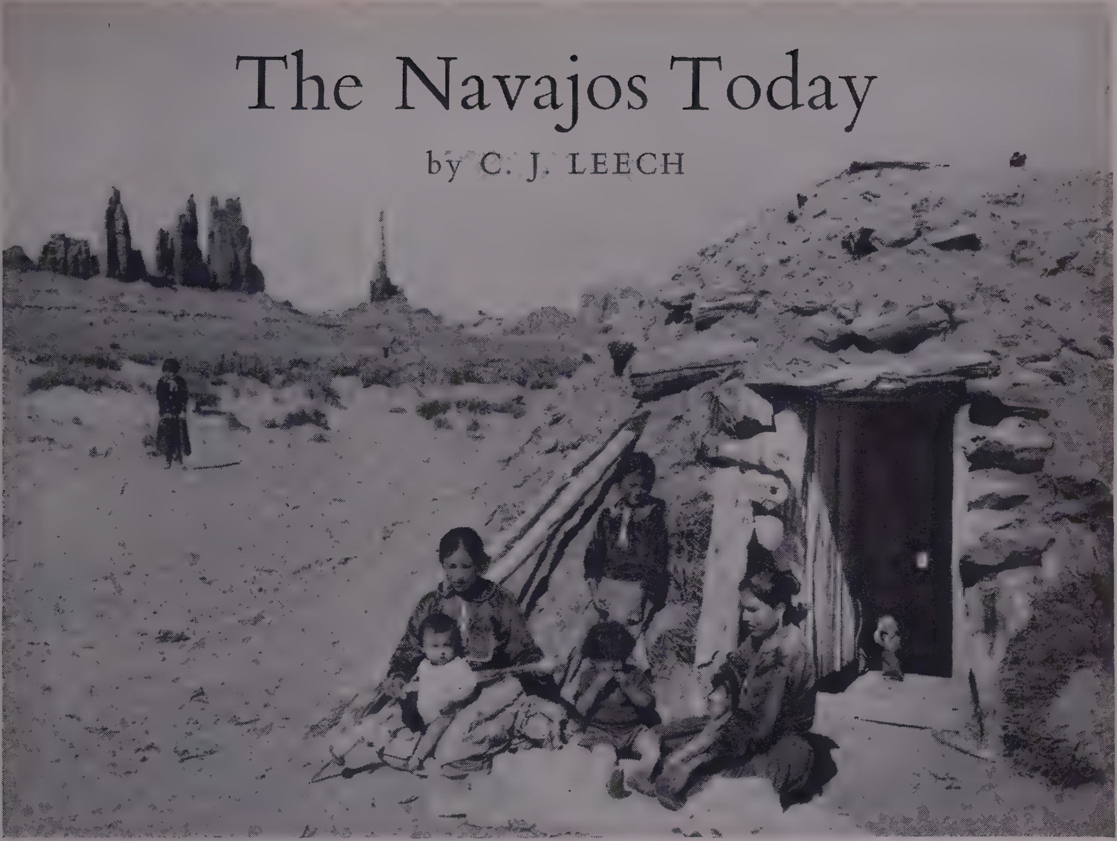
Forty hours later a Catalina flying-boat, which had been brought to Merauke from Australia, came over escorted by a squadron of Kittyhawks. She carried a relief party and embarked our wounded.

The rest is a nightmare: the journey to Merauke with a medical officer feeding us on sulfa drugs all the way . . . the intelligence officers following me right up to the operating-table, surrounded by waiting surgeons . . . the blessed oblivion under anaesthetic . . . long nights in the heat and dark of the jungle . . . six months in hospital gazing at the white walls, with three wounds and an incurable disease. Life thenceforth was never the same again.

"By the time the Japanese surrendered in 1945," said *The Times* recently in a leading article, "most of New Guinea had been recaptured, at a cost in Australian lives that has imprinted New Guinea indelibly on the Australian consciousness." During his visit to Europe last August the Australian Minister of External Affairs, Mr Casey, spoke at the Hague of Australia's full support of Dutch sovereignty over the western half of the island, in face of claims put forward by the Indonesian Government to what they call "West Irian". It will be a long time before the inhabitants—less than a million people scattered over a huge area, mostly in small, isolated tribes—are in a position to determine their own future. Meanwhile cooperation between Australia and the Netherlands in the administration of both parts of the island is growing; and at a conference of Australian and Dutch administrators held in Canberra last October measures for the economic, social and educational advancement of its peoples were discussed. Australians will not easily be convinced that New Guinea would benefit by a change of trustees for its future.

The Navajos Today

by C. J. LEECH



Camera Press

(Above) *A "hogan", one of the traditional dwellings of the Navajos, which are dotted over the Reservation and not clustered in villages. Made of logs, mud or rocks, they are without windows*

An article in our November, 1958, number described the present situation of the oldest Australians, the Aborigines, in relation to the white majority and its policies towards them. The following article affords, by way of comparison, an example of the problems confronting the oldest Americans: the case of the Navajo Indians, the largest tribe in the United States, now numbering over 80,000

My first contact with the Navajo Indians was last January when, en route from Washington to Los Angeles, I paid a visit to an old friend who, tired of the restrictions of city life, had joined the United States Public Health Service and had been posted to Piñon in the heart of the Navajo Reservation to reopen the clinic there.

The Reservation itself lies mainly in the north-eastern corner of Arizona and extends into the adjoining States of New Mexico and Utah. It covers an area of over 15,000,000 acres—slightly smaller than Scotland—and it is a land of spectacular contrasts, varying from flat alluvial valleys through broad upland plains to the high mesas. In the north-west portion the mountains rise to over 10,000 feet, whilst in the lower valleys buttes and ridges break up the skyline. The whole area is fissured with canyons often extending to over 2000 feet in depth.

Piñon lies about a hundred miles north of the main East-West highway, and in this hundred miles a wide variety of vegetation and climate can be seen. The harsh and unfriendly country which abuts the painted desert gives way to a sparse type of grassland, lying at about 4500 feet. This in turn leads to the high mesas around the 6000- to 7000-foot mark, where scrub and sage-brush predominate. Heavy coniferous stands of timber are found, generally over 7500 feet, and stream-beds and gullies crisscross the land like veins in a wrinkled palm. Piñon itself consists of little more than a government boarding-school, surrounded by two trading-posts, a Franciscan mission and the clinic. Apart from a few Navajos who were living in the stone-built quarters alongside the school, there was no semblance of a village, for the majority of the tribe live in scattered "hogans" dotted over the Reservation. The hogan itself, the traditional Navajo dwelling, is usually a hemispherical structure, the walls being made of logs, mud or rocks. It has a doorway facing east, and a smoke-hole in the centre of the roof, but no windows.

Up on this "black mesa" the pattern of traditional life which had gone on for centuries seemed relatively undisturbed, the economic basis being a combined agricultural-pastoral economy, the planting of a few acres of corn (maize) and the raising of mixed herds of sheep and goats. The first morning after my arrival many Navajos converged on the trading-post for their supplies. They arrived in entire families, the men wearing the conventional Western garb, that is "levis" (jeans), high-heeled boots, and brightly coloured shirts; the women long fluted calico skirts and contrasting velveteen blouses, often with a blanket draped over their shoulders. Some of the men wore their hair long under their Stetsons, tied in a knot behind the head with white woollen yarn, or sometimes with a multi-coloured bandana around the forehead, the tresses at the back overflowing down the nape. Both men and women wore varying amounts of jewellery: belts, necklaces and bracelets decorated in silver, turquoise and coral.

Their purchases consisted in the main of coffee, mutton, flour and quantities of "pop". The trading-posts, which resemble the old-style general store inasmuch as they cater for all needs, from frozen foods to wagons, do in fact 'trade'. Navajos will pawn their jewellery where lack of dollars necessitates it, and a good rug will fetch anything from $200 up. One trader showed me his pawn-shop, a room which had three walls covered from floor to beam with an assortment of belts, necklaces and bracelets, whilst on the floor lay half-a-dozen saddles. "I've got about $60,000-worth of stuff here," said the trader, "so I act as their banker too. I don't as a rule give credit, but when I have done I've found that I've had few bad debts. It may take them some years to pay it off, but they manage eventually."

I was surprised on this first visit to find that such a pattern of existence still survived in the United States, which annexed from Mexico in 1848 the vast territory containing the

Sheep on the sparse grassland of the lower valleys of the Navajo Reservation. A disappearing feature of traditional life is the use of children to tend the sheep which were the basis of the Navajos' tribal economy. Nowadays few children do this except during school holidays in summer

Leech

Navajos' country. Between 1863 and 1868 the majority of the tribe—about 9000 out of a probable 14,000—were imprisoned in a concentration camp at Fort Sumner, New Mexico. The 300-mile march to Fort Sumner, a catastrophe in tribal history, is remembered by the Navajos as the "Long Walk". It came as the reprisal for a series of raids made by the Navajos upon neighbouring white settlements and those of the Pueblo Indians living permanently in villages. They had taken advantage of the American Army's preoccupation with the Civil War; but the record of such raids went back to their earliest contact with the Spaniards, in the 17th century. By the time English-speaking Americans first encountered them during the United States-Mexican war of 1846, they had already adopted many fresh elements into their culture. Their very name indicates this: the Pueblo Indians among whom they settled at an unknown date spoke of them as *Apaches de Nabahu*, "Strangers of the Cultivated Fields", showing that they had taken up agriculture after a long migration which started (as linguistic analysis of their Athabascan language proves) in what is now north-western Canada. From the Pueblos they acquired numerous arts, such as weaving and pottery-making; and from the Spaniards sheep, goats and horses.

Leonard McCombe, Life *Magazine*

The Navajos come in from outlying districts, often by wagon, to the trading-posts or general stores which supply all their needs. They may exchange articles they have made for goods they want, lingering over each item before finally choosing

The Navajos are thus in many respects a highly adaptable people; but when they returned to their Reservation from Fort Sumner they made their new beginning within the framework of their old customs. The Reservation itself, established by a Treaty with the United States Government in 1868, originally measured about 3,500,000 acres. Subsequent additions have more than quadrupled this area, affording plenty of space for scattered groups of Navajo families to pursue their traditional isolated existence.

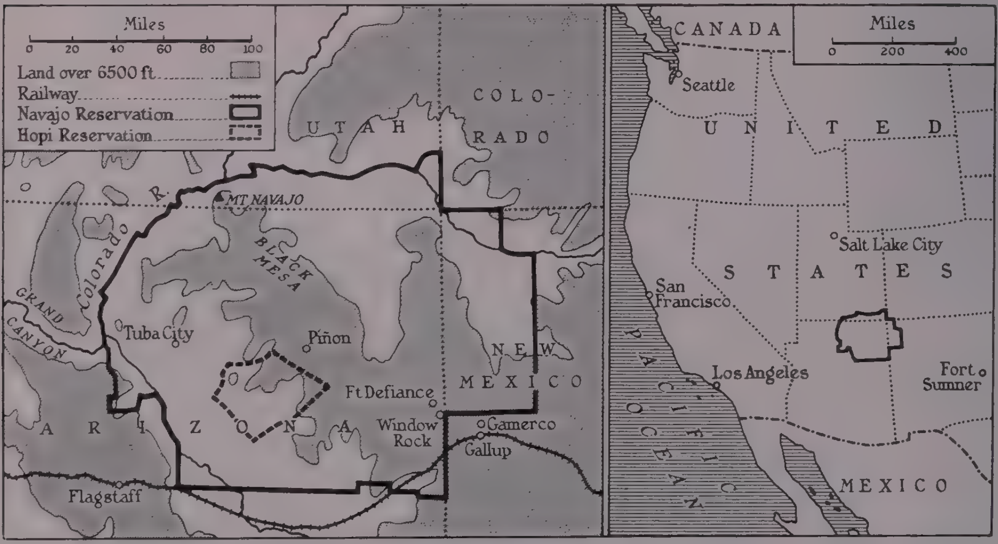
Nevertheless the Reservation is not big enough to support the Navajos, who have themselves multiplied sixfold since 1868. In most parts of it flowing water is rare and rainfall is scant; great heat in summer and cold in winter, high winds and frequent sand-storms make agriculture precarious. Neither this nor the Navajo flocks, though they steadily increased in numbers, would provide enough additional food (or income to buy it) for the growing population. More and more Navajos therefore had to seek employment off the Reservation, usually in seasonal work. One source of major income for the tribe arose in 1923 with the discovery of oil on the Reservation; and this had an important by-product in that it led to the organization of a Navajo Council to speak for the tribe as a whole and receive payment on its behalf.

By 1933 the expansion of Navajo flocks had reached a point where it was evident that the Reservation was being overgrazed and becoming badly eroded. About 40,000 sheep and goats in 1869 had increased to 749,000. In 1933, therefore, the Federal Government began a programme of stock-reduction which, though essential to restoring the carrying-capacity of the ranges, was deeply resented by many members of the tribe.

This programme was part of a much larger scheme of reforms inaugurated by John Collier, whom President Roosevelt appointed Commissioner in charge of the Bureau of Indian Affairs. Without entering into the complicated history of that office, it may be said that none of its thirty-one previous holders had been so actively concerned to defend the interests of the American Indians. Moreover, owing to Roosevelt's long tenure of the Presidency, Collier held it for twelve years, from 1934 to 1945. The Indian Reorganization Act of 1934, sponsored by him, had an enormous effect on the relations between the Indians and the Federal Government, especially on the Indian Service through which those relations are conducted. The alienation of Indian lands was stopped and a real effort was made to give all Indians greater tribal and local participation in the management of their own affairs; as well as to decentralize the Indian Service and employ more Indians in it. A revolutionary change concerned education. As Edward Everett Dale says in *The Indians of the Southwest*, "for generations the Indian Service had sought to eradicate everything which might remind the child of his former life and to substitute the forms of white civilization". Now Indian schoolchildren were to be allowed to speak their own language and encouraged to use their own Indian designs in drawing, painting and handicrafts.

Elections were held to determine which tribes would accept the terms of the Reorganization Act and come under its authority. The Navajos (by a narrow margin of votes) refused. They were thinking about their sheep and looking back with resentment to the long series of fluctuations in Federal policy, changing with each administration, in which even so well-intentioned a programme might merely conceal another attack on their identity as a people. Nevertheless the New Deal agencies set up at that time to combat the nation-wide depression, such as the Civilian Conservation Corps, had a great effect on their life. Many young Navajos enrolled by the special Indian branch of the C.C.C. earned their first regular wages and learned to use new tools and handle machinery, for which they showed considerable aptitude. World War II, in which some 3600 Navajos served and many more were employed in ordnance plants, increased still further their contacts with other Americans.

The Reorganization Act left largely untouched the special rights and status of the Indians which had begun with the treatment of their tribes as sovereign nations and had been maintained when they came to be regarded as wards of the Federal Government. Special status included the tribal ownership of land, held in trust and exempt from taxation,



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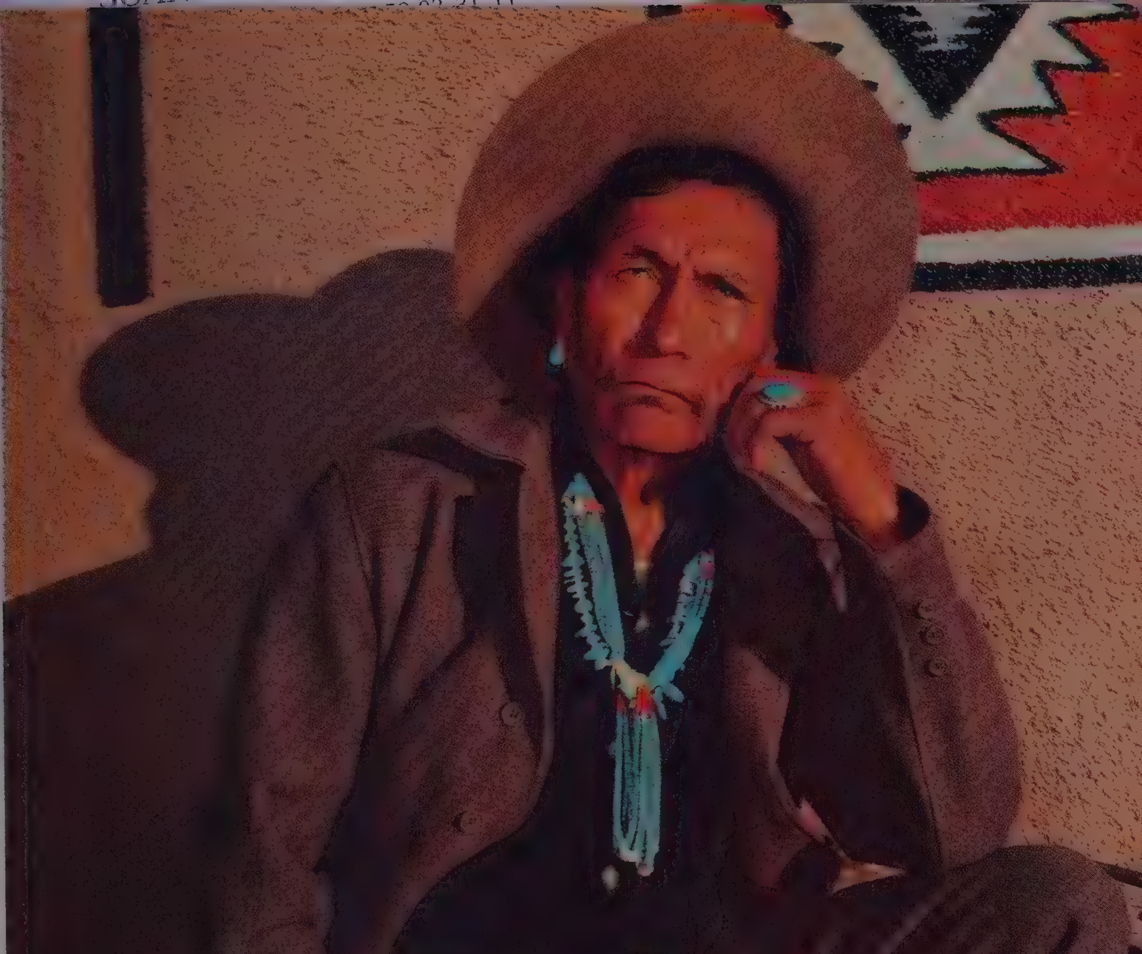

Ektachrome

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A Navajo "Singer" or medicine-man. He will have devoted many years to learning the complicated rituals designed to remedy various troubles of life, especially sickness. Purification is the essence of all these ceremonies, which include chants and dances

'Sand-painting' is a feature of several Navajo rituals. The paintings are made of charcoal, pulverized minerals of different colours, corn-meal, pollen and dried flower-petals. The designs represent legends of the Holy People who inhabit the supernatural world, or abstractions of sacred powers. A patient seated on such a painting is brought into communion with the Holy People as part of his or her cure

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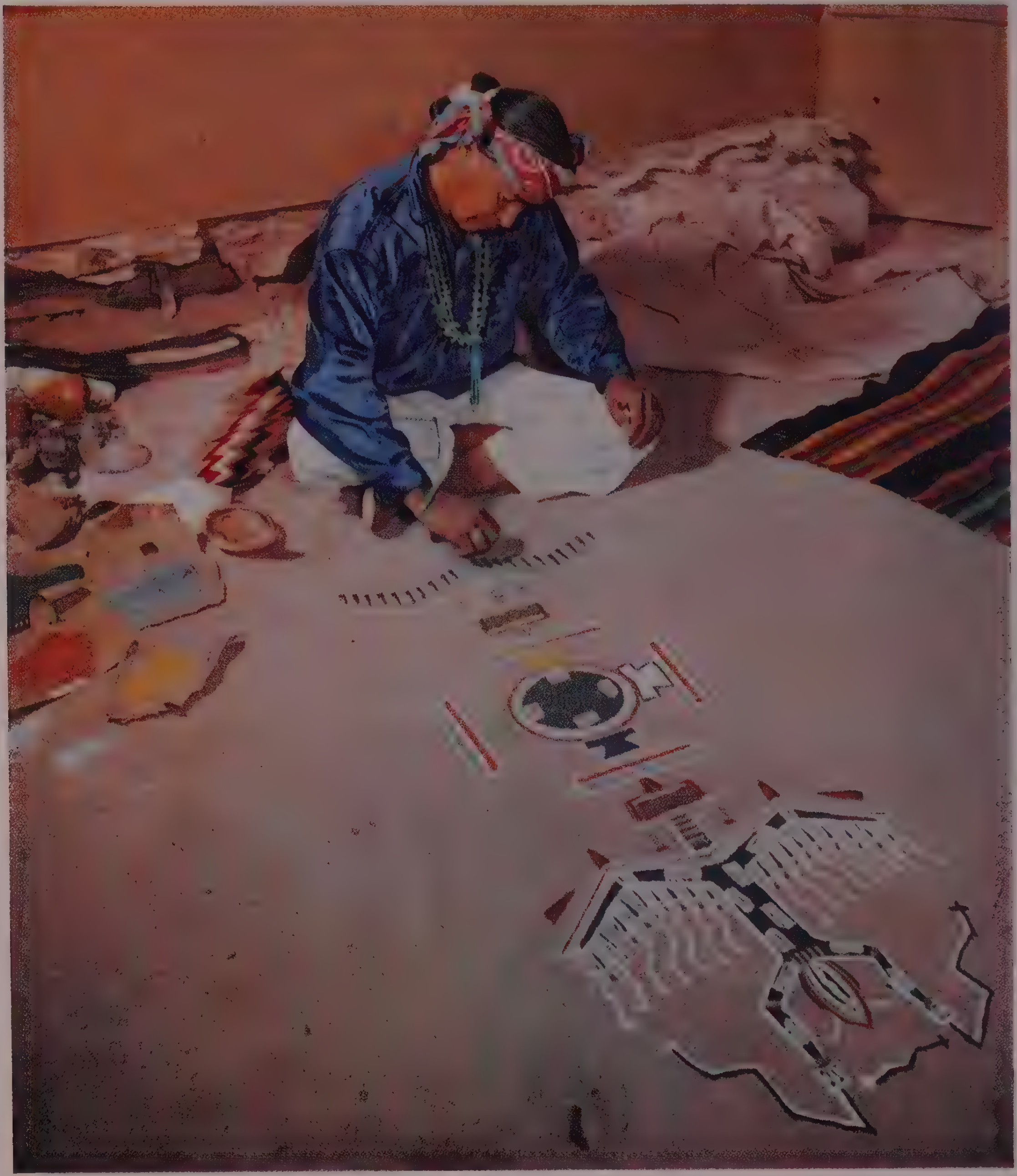

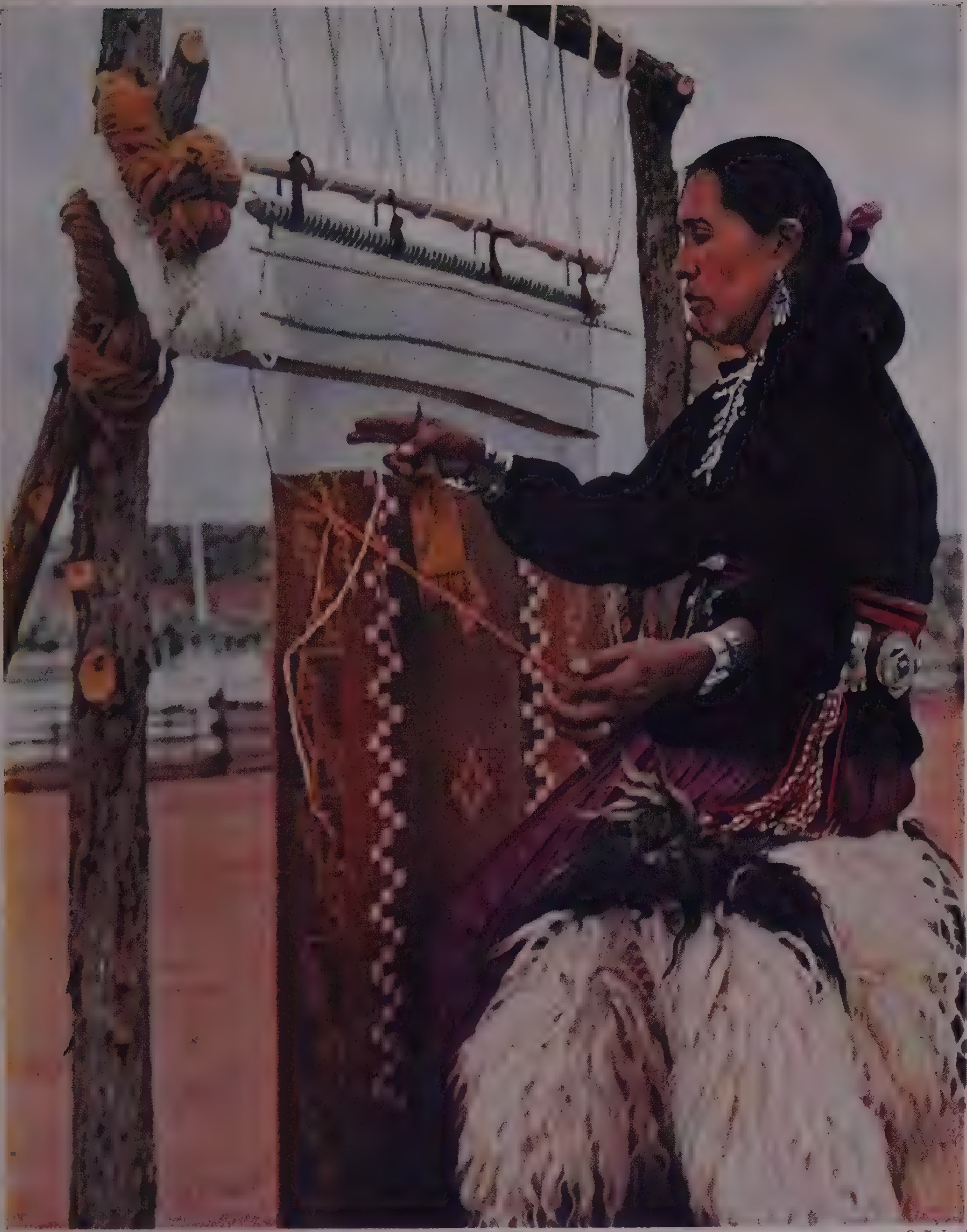

Kodachrome

C. J. Leech

Rug-weaving and jewellery-making supplement agriculture and stock-keeping in the Navajo economy. Weaving affords a continual source of extra income to the women, who usually enjoy a position of considerable influence within the family. Most Navajo rugs are sold to traders, from whom the Navajos purchase blankets to wear themselves

Kodachrome

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Less than ten years ago well under half the children on the Navajo Reservation were enrolled in any kind of school. Many Navajo families opposed children's attendance at school; partly because the children's help was needed as shepherds; and partly because most of those that did attend were sent, owing to the migratory habits of their parents, to boarding-schools where they received an education which rendered them unfit for the traditional way of life. School facilities were also notably inadequate. But recently the situation has changed in both respects: economic necessity is compelling the Navajos to appreciate the skills required for survival in the white man's world; and their educators see more need for a programme that will not wholly destroy their ancestral culture

C. J. Leech

Ektachrome

as well as exemption within Reservation boundaries from the laws of the several States. Special rights included the Federal Government's obligation to provide such services as those of education and health, for which other communities in the United States are expected (broadly speaking) to make local provision. In the late 1940s the question was being more insistently asked: Were the Indians to go on forever being wards of the government, set apart as a special group and treated differently from other American citizens?

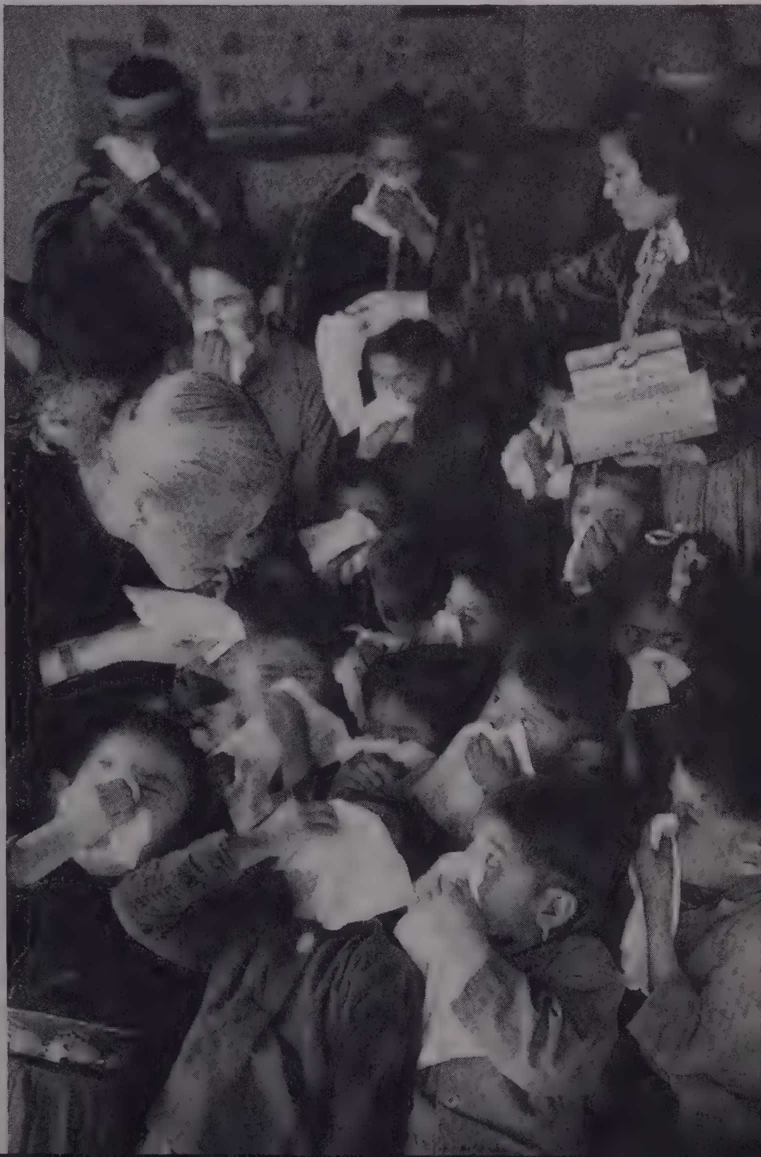
Part of the answer obviously depended on the extent to which Indians could take their place on equal terms with the rest. In the case of the Navajos and Hopis (whose little Reservation that of the former surrounded) a fresh start in enabling them to do so was made in a "Long Range Rehabilitation Program" for those tribes, devised by the Indian Bureau and enacted by Congress in 1950, with an appropriation of $88,570,000 for land improvement and irrigation; the exploitation of timber and mineral resources; the fostering of business enterprises undertaken by the Navajos and Hopis; more schools, hospitals and roads; and help in finding work off the Reservations. Above all, the programme demanded cooperation with the Indians themselves and their training in useful skills.

The policy of the present Republican Administration is to terminate the Indians' special rights and status and to promote their assimilation as rapidly as possible into the general American society. In July of last year I returned to the Navajo Reservation in order to see for myself how this policy tied up with the abovementioned programme, what solutions of particular problems were being worked out, and what the Navajos thought about them.

A good starting-point was Window Rock, the centre of governmental and tribal administration for the whole area. The Navajo Agency with its headquarters there is an offshoot of the Bureau of Indian Affairs, and is split up into a number of branches dealing with the day-to-day application of various aspects of the Federal programme. In addition to these Federal departments are those of the tribe itself, which were brought into being as a means of effective liaison between tribe and Bureau. Much of the tribal development is due to the funds which have been made available through the lease of lands for oil exploration. Some $33,000,000 was paid over in 1956, and the present policy of the tribe is to invest the money in services which have not been, nor are likely to be, furnished by the

Lessons for Navajo children start with things that are even more elementary than the three Rs: nose-blowing, for example

Leonard McCombe, Life Magazin



C. J. Leech

The Navajo Tribal Council in session at Window Rock. It consists of seventy-four members, one for each voting district on the Reservation. It spends the tribal revenues, derived largely from oil, and cooperates with the Navajo Agency, an offshoot of the Federal Bureau of Indian Affairs. The murals on the walls of the council-hall, by a Navajo artist, depict the history of the tribe

government, such as a tribal scholarship fund.

Window Rock on this first morning was full of activity, for it was the opening day of the summer session of the Tribal Council. For a long time after its first formation in 1923 the Council remained suspect in the eyes of many Navajos, especially during the stock-reducing programme of the thirties and early forties; but since the end of World War II it has rapidly come into its own, and now reflects the opinions of the Navajos rather than merely endorses the decisions of the Bureau. The Council consists of seventy-four members, all Navajos, elected from that number of voting districts on the Reservation. Two of the members are women. Within the Council there is an advisory committee which meets once a month and proposes legislation, establishes the tribal budget, and draws up agenda for the quarterly session. This first meeting was devoted mainly to a résumé of events which had occurred since the last meeting, given in Navajo by the Council chairman, and an address by the General Superintendent of the Agency. Both English and Navajo are spoken at all meetings, there being an interpreter who translates into whichever language is necessary. The language barrier is formidable, for while many of the older members understand little English, it apparently takes a white man about five years to acquire a working knowledge of Navajo. Moreover, although the Navajo language is a complete one, it is often impossible to translate the exact English words into Navajo: rather is it a question of transmitting the general concept of what has been said.

I should have liked to attend more Council meetings, for they had all the appearance of a pocket Congress in action; but my time was limited and Mr Paul Jones awaited me. Mr Jones is the present chairman of the Tribal Council. Dressed in a neat single-breasted suit, with polka-dot bow-tie, and seated behind a desk of impressive dimensions, he

(Below) *A Navajo having a splinter removed from his eye at a hospital on the Reservation. He had to travel seventy-five miles to obtain treatment. Since 1955 the responsibility for medical services has been transferred from the Indian Bureau to the United States Public Health Service and much-needed improvements in health-facilities have resulted, including a field service, more clinics and a new hospital.* (Right) *Along with this expansion, a training programme for Navajo students and nurses has been started. Here a Navajo nurse tends one of her charges at the Fort Defiance hospital*

Leonard McCombe, Life *Magazine*

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looked like a prototype for the executive business man, as indeed he required to be. Mr Jones summed up the situation as follows.

"Assimilation, you know, is inevitable. We do not intend to make the same mistake as other tribes have done in the past and fight it. What good would that do? The Navajo people have to eat like everyone else; and in order to eat you have to earn. Even with the revenues now coming in from oil the Reservation cannot support our growing population, so there must be an ever-increasing flow of our younger generation into the outside stream."

"That seems an obvious solution," I said, "but will they be able to swim?"

"Well, there you have it," he replied. "All other considerations apart—and they are many—the tribe at the present time is 80 per cent illiterate, so the emphasis must be on education. They must at least have a knowledge of the English language, and with it an opportunity to learn a skilled trade. That will be a beginning."

I thought that this was going to take a lot of time and patience.

"Of course," he said, "this is not something that you can do overnight, or even in a single administration. The Navajos will not have reached full political and social competence in my lifetime, or yet in yours."

"You mentioned the question of other considerations," I said. "I suppose you mean discrimination?"

The more conservative Navajo men still wear their hair long. This youth is about to lose his locks on his induction into military service. Some 3600 Navajos served in World War II, greatly increasing the tribe's contacts with the outside world

y courtesy of the U.S.I.S.

"That is certainly a big factor, especially in the nearby towns where the white man has had contact with the Indian over an extended period. I myself lived in Chicago for eighteen years and found little trace of it there. Socially it is not too much of a problem; we are O.K. in cinemas. But jobs—well, that is something else."

"What?" I asked.

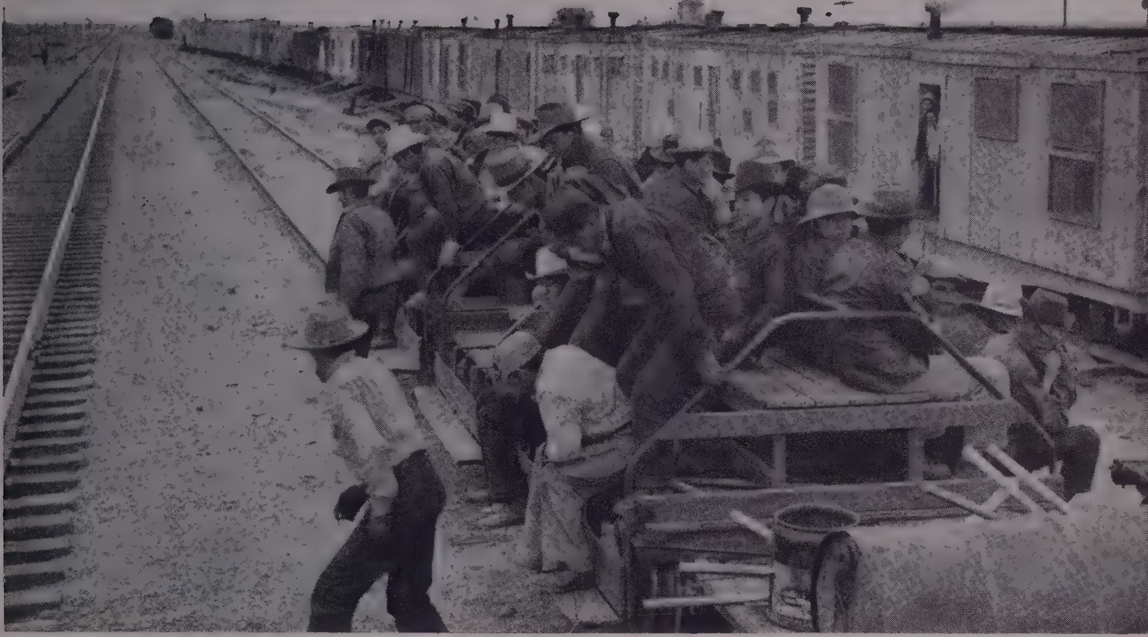
"It's not always a question of skin-colour, sir, although you will find some of this wherever you go, even in your country. It is more a lack of understanding of the Navajo outlook on life. What matters to you, may be of little importance to us."

"But of necessity it must be of growing importance, mustn't it?"

"Oh, yes," he replied smiling; "it is after all a white man's world."

I found much the same opinion expressed by other members of the tribe to whom I spoke in Window Rock. All of them were aware of the changes that were being wrought and the improving status of the tribe in its effort to manage its own affairs; but, as a councilman said: "We are not ready for 'termination'. Sure, we are a lot more organized than even three or four years ago, but we still have a long way to go; and above all we must not be rushed into this. In the past we have been rushed too much—and see where it got them."

Discussing the difficulties that arose with increased contact with other Americans, one Navajo official said: "You have to understand that we see things differently. When we move in among your people it means a big change in our outlook. We Navajos look on a man as part of a group and he is expected to function as one of that group. Not so with you: to your way of thinking the individual is more important. Success in your world more often depends on personality and making the most of it. For instance, over there" he said, pointing to a 'motel' across from the administration block,



Leonard McCombe, Life Mag

The Navajo Reservation has long ceased to support the tribe and many young men earn a living as railway-workers. While doing so they live in box-cars and ride to work each morning on hand-cars. Off-Reservation work is steadily breaking down the Navajos' tribal isolation from other Americans

"is a business run entirely by Navajos as a tribal enterprise. But it can't succeed without abilities that we have never been brought up to value, though they are part of the white man's normal training: giving quick service, paying attention to details and showing a friendly manner to strangers. To us this manner seems false, to the white it is what he expects—so, you see, it is not easy."

The contrast between the way of life in Piñon and that in Window Rock is extreme. Many of the tribal officers live in neat modern bungalows which surround the administration block, whilst the younger Navajos employed in secretarial positions in the tribal branches commute by bus to the neighbouring town of Gallup. Indeed, one of the difficulties in dealing with the Navajos is that they are not culturally homogeneous; and much of what is planned and authorized by the Tribal Council and in the offices of the Bureau may seem to have little bearing on the daily existence of families living in remote areas.

But as I travelled over the Reservation roads the infiltration of modern Americanism could be seen, especially in the shape of such material benefits as the pick-up truck which is now a familiar sight, replacing more and more the horse-drawn wagon.

The old order is gradually changing in other respects. Where it was a common sight to see the children tending the flocks, now it is a rarity, for most children attend school—some 27,000 were enrolled at the end of 1957, an increase of 100 per cent over 1954—and grandmother tends the flock. In the summer months, however, during the school holidays, it is possible to see the younger Navajos as herdsmen. I only saw this on two occasions and one of them turned out to be surprising. The lad spoke English; and it was he in fact who started off the conversation by riding over and asking me where I came from.

"California," I said, "but originally from England."

"I know London well," he said, "Germany too."

"You do?" I said. "How's that?"

"I was in the army for two years."

"What do you do now?" I asked.

"I go to school in Gallup. I learn to be a carpenter. My family live over there—" he pointed to two hogans on a slight rise about half a mile away. "In summer I help with the sheep."

"What are you going to do when you finish school? Are you going to live on the Reservation?"

"Dunno," he said, "haven't thought about it—maybe I'll go to Gamerco." This is the place where Navajo Industries Incorporated have established a furniture factory representing a cooperative effort by the tribe and private industry to provide local employment opportunities for Navajos. Some thirty-five persons are employed there.

"How do I look on this horse?" he asked.

"You look fine," I said, "Why?"

"That's good," he replied; "first time I've ever ridden a horse!"

Yes, I thought, the old order is certainly changing.

To those of the younger generation who have received some education and have acquired a trade or a means of obtaining a livelihood 'outside', life on the Reservation seems to offer little inducement for a permanent return. I spoke to a young nurse who had been working at the Fort Defiance Hospital for almost six months. She had been trained "back East", as she put it, and had returned because her family were all in this district; but now she was wanting to move to the West Coast.

"There is nothing to do here," she explained, "no entertainment."

"How about your family?" I asked. "What do they think?"

"Oh, they have always lived on the Reservation," she replied. "They do not understand."

"How will you feel about moving into a strange city where you will know no-one?" I asked.

"That is why I want to go to the Coast," she replied. "In Los Angeles and San Francisco there are already many Navajos and I can meet them; and there are Indian clubs where we can talk."

This is in fact a great help with the Bureau's relocation policy; for where a nucleus of Navajos has been established in one of the major cities, the newly arrived have, naturally enough, less difficulty in making the necessary adjustments; and the Bureau hopes that in time this will have a snowball effect and increase the flow of families to the towns in appreciable numbers.

The young nurse represented one aspect of a recent important change affecting the Navajos. Prior to July 1955 the responsibility for providing medical services for them rested with the Indian Bureau, but since that date the United States Public Health Service has taken over this task, with a consequent increase in health-facilities. A field service, essential in such wild and thinly populated country, has been inaugurated and several clinics are under construction; while a new 125-bed hospital was opened not long ago at Tuba City on the western edge of the Reservation.

Besides changes in the outlook for education and health, economic change is having a great effect on Navajo life and its speed is accelerating. The Navajo living on the Reservation is now usually a seasonal wage-worker, with local employment on the railroads or harvesting. Plans are afoot for developing more fully the natural resources of the Reservation such as oil, uranium and timber and for the establishment on or near the Reservation of new plants by industrial organizations which will employ Navajo labour. The tribe has already subsidized such plants in their initial stages, for example the furniture factory at Gamerco already mentioned and the Lear electronics plant at Flagstaff, and would be willing to do so again. All these developments tend to increase the average family income and the goods and services and opportunities to which more money is the key are gradually breaking down the traditional pattern of life. When the road and communications programme now in the making in Window Rock is complete, even the more remote areas of the Reservation will be accessible and the old core of cultural resistance may well disintegrate.

Most of the Bureau officials I spoke to seemed to think that the lines of the present policy, irrespective of whether 'termination' is the goal or not, are at least leading in the right direction. His past history has shown that where he thinks it is to his advantage the Navajo is able and willing to borrow ideas and means of livelihood from other cultures; and this ability to pick and choose will surely be exercised when it comes to adopting from the American way of life the techniques necessary to his daily existence. If the present policy is followed without too much political fluctuation, a point will presumably be reached where the Navajo will be able to integrate himself into the general economy at his own speed and in his own way, retaining some of his traditional patterns of behaviour. Just when everybody arrives at this point in time is unforeseeable—as one Bureau official put it: "Ask me again in a hundred years, and maybe I'll give you an approximation; but don't come much before."

Looking After Nature

by E. M. NICHOLSON, C.B.

This is the second of four articles describing the work of the Nature Conservancy, the National Trust and the National Parks Commission. Mr Nicholson has been Director-General of the Nature Conservancy since 1952. A Civil Servant of long experience, he is also a distinguished naturalist, being senior Editor of British Birds *and having written three books on birds, notably* Birds and Men *(Collins), as well as a general account of* Britain's Nature Reserves *(Country Life, 1957)*

In his article in the January number of this Magazine, entitled "Guardians of Our Patrimony", the late Sir Stephen Tallents, who is so much missed by lovers of Nature and the country, described the Nature Conservancy with the National Parks Commission and the National Trust as "making our countrysides more interesting both to those who live in them and to those who visit them". Even those who do neither may also derive benefit from the work of the Nature Conservancy, over half of which consists of research into animals and plants, soils, climates and landscapes and their innumerable repercussions on one another in natural or semi-natural conditions. Only about one-seventh of the Conservancy's resources, at present amounting to some £350,000 annually, goes directly on Nature Reserves. These, however, being scattered through the length and breadth of Britain from Shetland to the English Channel and from East Anglia to Anglesey, are understandably the main focus of outside interest.

What is not yet at all generally understood is that these Reserves represent a revolution in attitudes towards man's relations with the fauna, flora and landscape. Until quite recently bird-sanctuaries and Nature Reserves were regarded as areas of land to be 'saved' from development, destruction and in extreme cases from any form of human disturbance by being acquired and left just as they happen to be, under a somewhat flimsy umbrella of legal protection backed in the most favourable cases by wardening and sometimes by fencing against access. It is now recognized that in densely inhabited and technically developed countries such protection and preservation is quite inadequate to prevent irreparable losses among the native fauna and flora due to air and water pollution, to pests and weeds and animal and plant colonists or other subtle influences. Indeed, most 'natural' habitats in populated countries have been much more influenced than used to be thought by human activity; and the suspension of traditional practices of cutting peat or firewood, or grazing livestock, may quickly result in the Nature Reserve which has ostensibly been 'saved' becoming a useless scrub. In virgin territories the prevention of human disturbance is enough to enable the fauna and flora to maintain themselves more or less in their primitive state, relying on the surrounding natural reservoirs of native species to replace any temporary losses due to flood, fire or other catastrophes. In such countries as Great Britain, however, the Nature Reserves must often be their own reservoirs, or rather oases in a man-made desert, from which much of the original flora and fauna has already been eliminated.

For these and other reasons it is only on mountain-tops and a few other very simple habitats such as sand-dunes that the need for positive scientific management can be avoided if the maximum diversity of species and habitats is to be maintained. But it is not enough to resolve to embark on scientific management; it is first necessary to remedy by scientific research the great and in some areas total ignorance under which we labour concerning the underlying natural principles and processes. Therefore, while taking our first halting steps towards management in a very real spirit of humility, we must endeavour to pinpoint among the innumerable questions which we cannot answer those which it is most important to try to answer first, in order that we may enlarge our scientific knowledge and consequently increase our capacity to predict and to influence natural trends.

So our British Nature Reserves are not just beauty-spots to be visited or places in which to enjoy a sight of rare plants and animals, nor are they simply living museums or natural zoos and botanic gardens. In addition to these things, they are busy outdoor laboratories in which hundreds of scientists, some employed by, others grant-aided by and others simply invited and encouraged by the Nature Conservancy, are working to accumulate elementary knowledge and by experiment and observation to find out the reasons behind the fauna, the flora and the landscape as it is now. The programme of investigations is far too complex and many-sided to be described in a brief article, but it can at least be illustrated by taking a few examples from the different types of habitat represented in the existing national series of seventy Nature Reserves, and indicating briefly how they relate to one another and to the programme as a whole.

Starting on the seashore, the battle-zone between land and sea is of peculiar ecological significance and we may take as an illustration the Bridgwater Bay Nature Reserve in Somerset. The shore here has been much built up during the past thirty years by Cord Grass, *Spartina townsendii*, introduced from Poole Harbour and now covering some 220 acres of the 6000-acre Nature Reserve. The stiff stems of the Spartina trap particles of mud and by raising the beach-level tend to cause the eventual defeat of the Spartina in competition with the Common Salt-Marsh Grass, *Puccinellia maritima*, a raised sward of which occurs with *Festuca rubra* and other grasses on the less frequently flooded salt-marshes. The processes and speed of this natural succession and its occasional reversal are of practical interest in developing additional grazing-land and at the same time working with Nature to build up sea defences which in favourable conditions can remove the necessity for expensive engineering-works. In the public interest the Conservancy agreed with some reluctance to transfer a small part of this Reserve, not presently required for research purposes, to the Central Electricity Generating Board for the erection of the world's largest Nuclear Power Station on an adjoining site at Hinkley Point.

While at Bridgwater Bay natural processes are building up the land at the expense of the sea, the reverse process is seen at the Axmouth-Lyme Regis Nature Reserve in South Devon, where the chalk formed long ago from deposits on the sea-bottom is visibly tumbling back into the sea from which it first sprang. Through such giant earth-movements natural experimental conditions have been created, especially in the ravine left by a great landslip in 1839. Here we know positively from careful sketches made at the time and subsequent dated photographs that it took some sixty years before the trough formed by the landslip developed enough topsoil to become covered with vegetation, which was rapidly dominated by young ash-trees. The resulting spontaneous ash-wood is of peculiar scientific interest, both because its

The shore of Bridgwater Bay Nature Reserve illustrates the battle between land and sea. On the mud in the middle foreground the hybrid Cord Grass (Spartina townsendii), *introduced in this area thirty years ago, has established itself below the raised sward consisting mainly of Common Salt-Marsh Grass* (Puccinellia maritima). *Experiments have shown that Spartina can in favourbale conditions build up the shore and help to protect our coastlines against erosion by the sea*

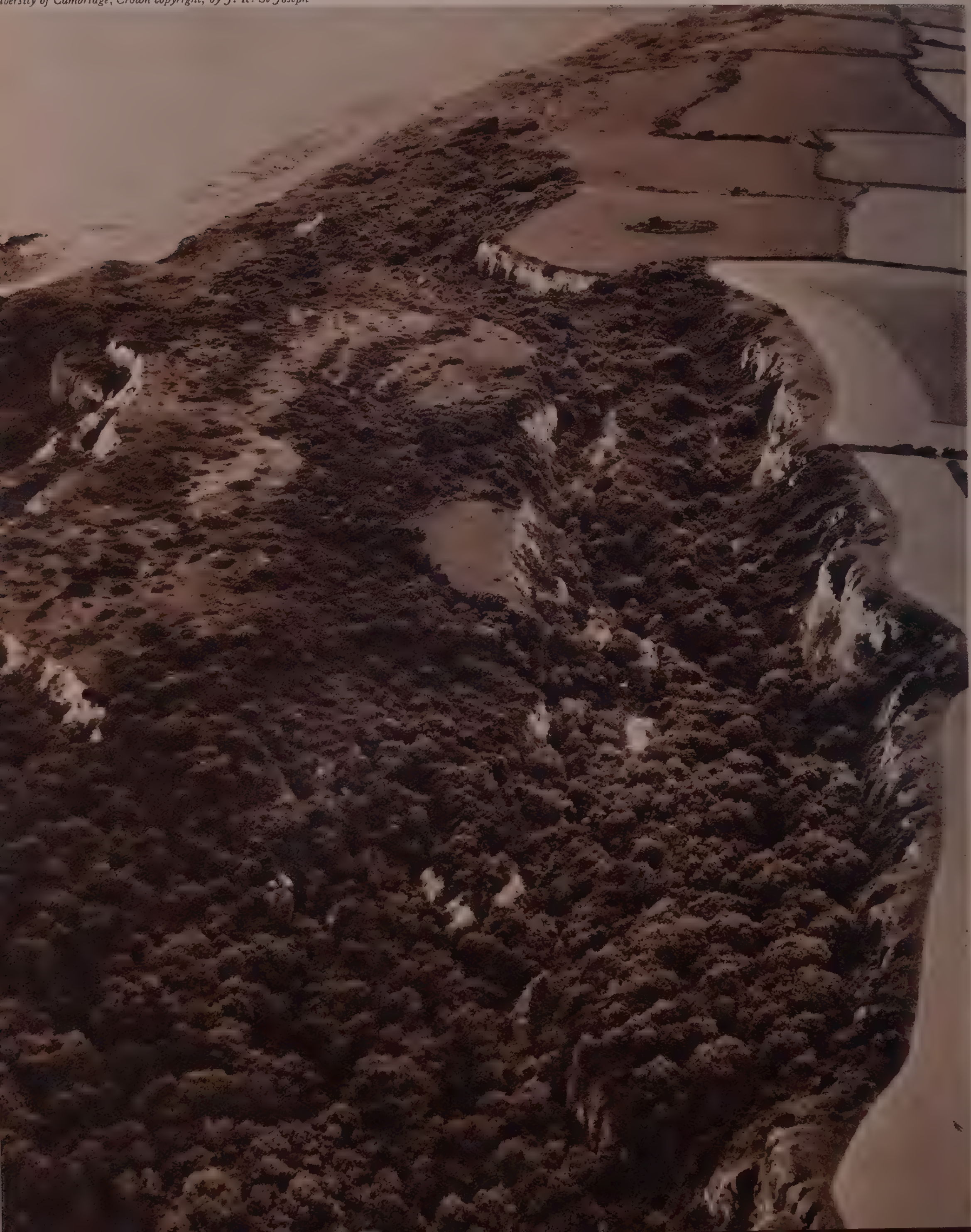
Nature Conservancy

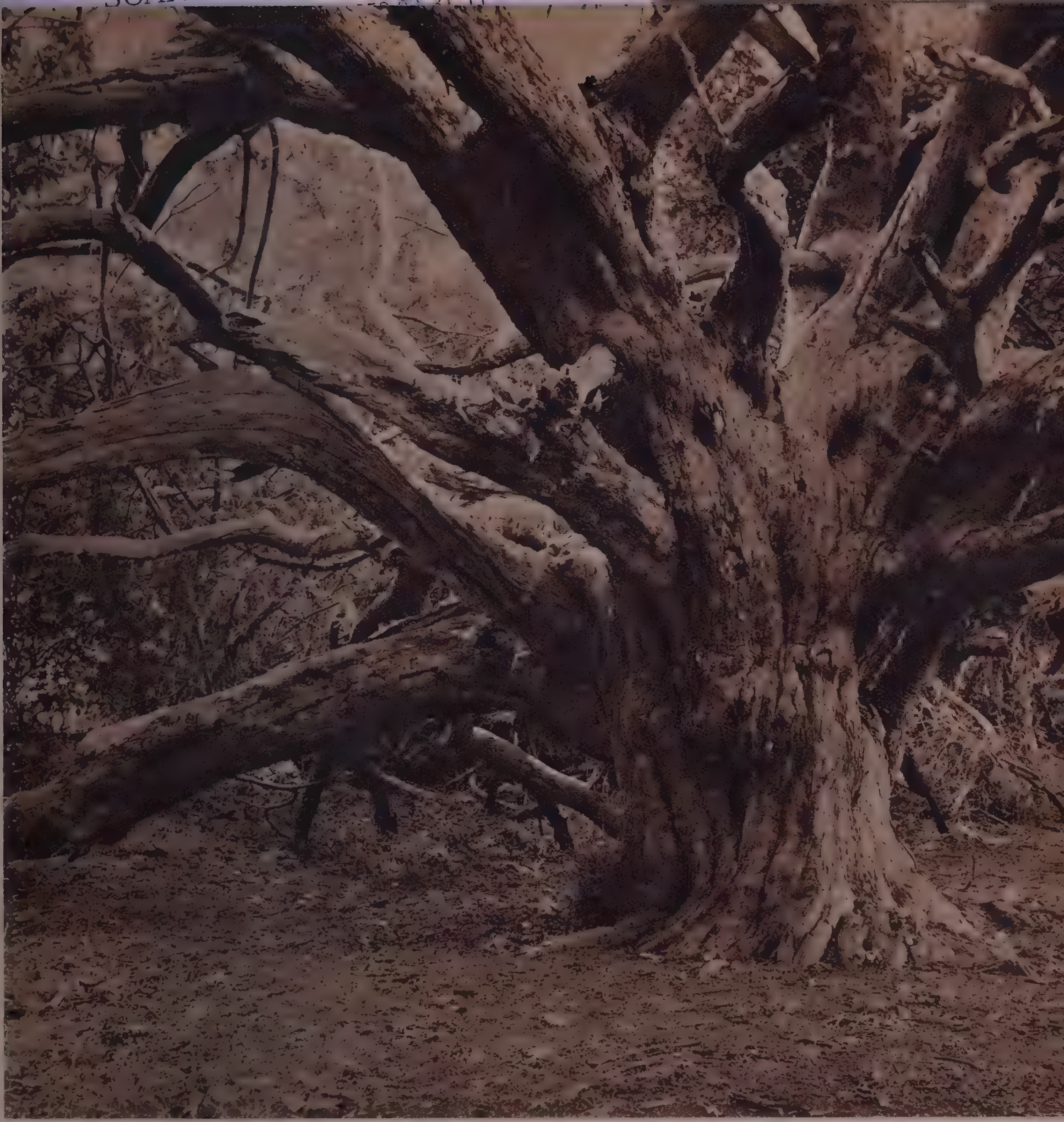
John Reyno

The Nature Conservancy, set up in 1949, manages on behalf of the Crown some seventy National Nature Reserves varying in size from under 100 to over 40,000 acres; in type they are just as varied: coast, mountain, forest, fen and moor. The reserves are outdoor laboratories in which Nature can be observed and studied, as well as being living 'museums' in which it can be preserved. For example, the 6000 acres of the Bridgwater Bay Reserve, a low coastal area of mud-flats in Somerset, is used for the study of vegetation and its part in building up natural defences against the sea. Colonizing vegetation is itself colonized by colonizing birds like the Greater Black-backed Gull, once a rare breeding species in England and still unusual on such accessible sites, only lightly screened by salt-marsh vegetation

The Axminster-Lyme Regis Undercliff Nature Reserve, a six-mile stretch of the south coast of Devon, is the longest extent of English coast at present safeguarded. On Christmas Day 1839 a landslip caused by excessive rainfall dislodged 8,000,000 tons of chalk and rock and created the gorge on the right. During the next sixty years it developed a covering of soil on which a luxuriant natural ash-wood has grown: one of the few natural woods whose entire evolution and history can be traced. To the left of the gorge the formerly cultivated fields were isolated by the landslip and have reverted to wilderness

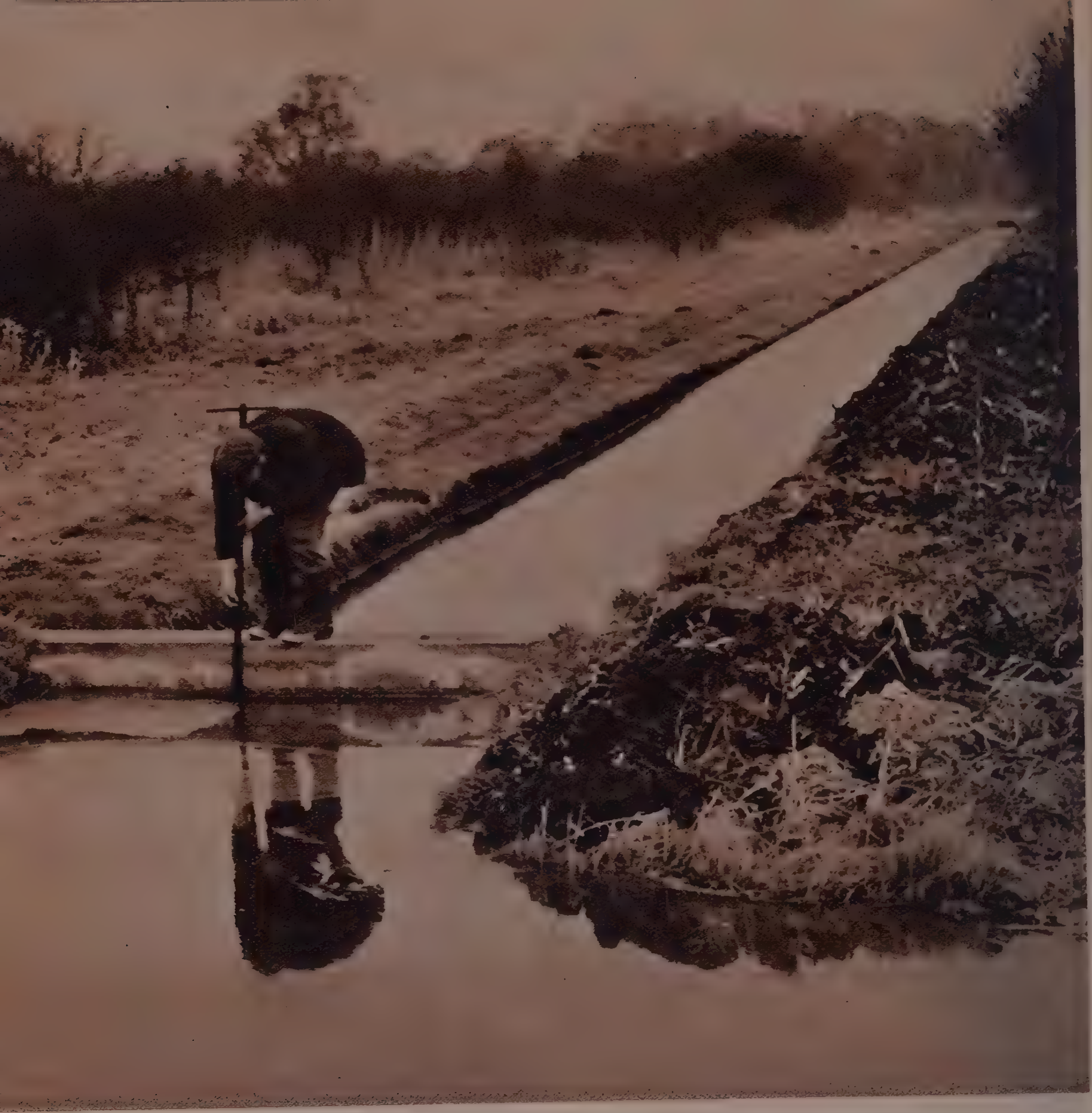
iversity of Cambridge, Crown copyright, by J. K. St Joseph





John Markh

Another form of forest is preserved in the 230-acre Kingley Vale Nature Reserve on the Sussex Downs, where there is one of the finest yew-woods in Europe. A few of its trees, such as this splendid specimen, are probably not less than 500 years old. Most, however, are much younger. As the photograph shows, they are effective in shading out possible rivals and form a dense 'litter-layer' or humus of fallen leaves, etc., whose gradual breakdown changes the composition of the basically chalky soil below

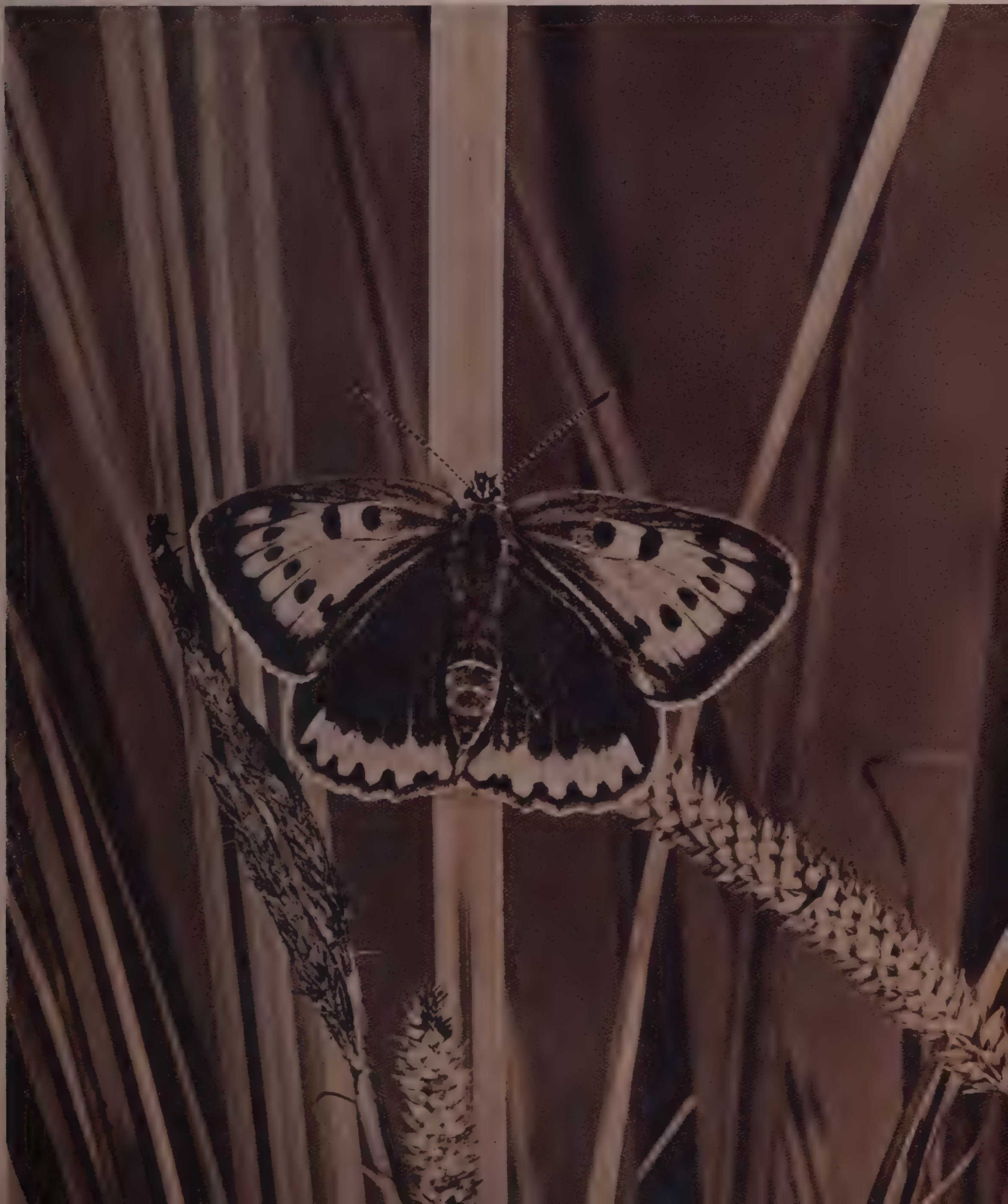


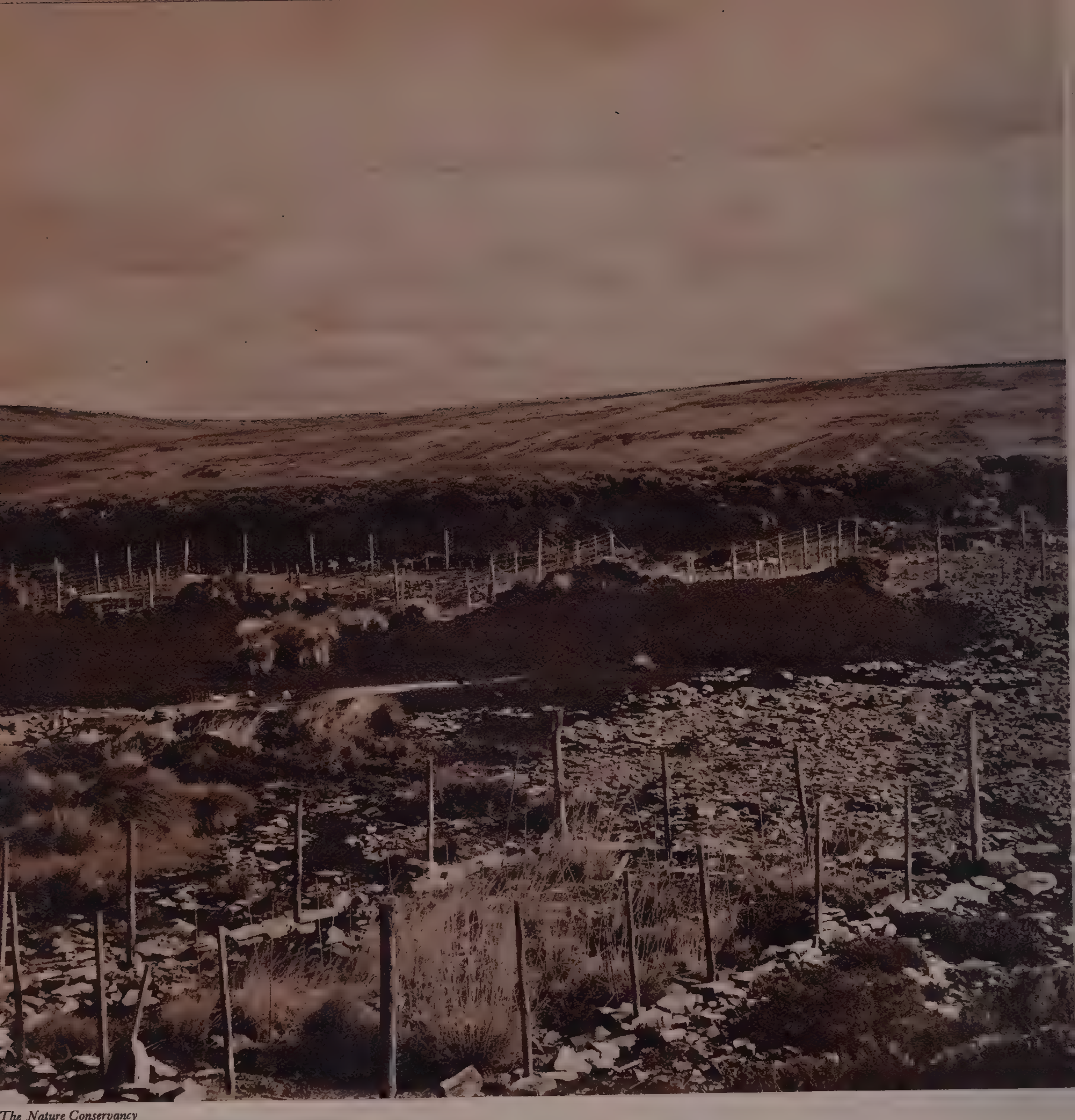
he Nature Conservancy

The Nature Conservancy Reserve at Woodwalton Fen, Huntingdonshire, is one of the last unreclaimed remnants of the great fenlands which stretched from Cambridge to the Wash. It well illustrates the functions of a Nature Reserve as a reservoir of lost or threatened species, as a living museum of disappearing habitats and as a laboratory for scientific research. The Warden, a skilled fenman, is here controlling water-levels to keep up the water-table and thus prevent the further spread of woody plants (seen in the background) at the expense of true fenland species. Woodwalton is famous for its insects

The old English Large Copper Butterfly became extinct when Whittlesey Mere was drained a century ago, but the Dutch form was successfully introduced at Woodwalton Fen in 1927. Decisions to introduce new or reintroduce lost species are not to be taken lightly, especially in cases where continuing artificial aid is needed or problems of collecting arise. Fortunately, the food-plant and other ecological conditions needed in this instance are known; the difficulties are much greater where such is not the case

S. Beaufo





The Nature Conservancy

The largest of the Nature Conservancy's reserves in England is the moorland area of 10,000 acres on the Westmorland Pennines known as Moor House. The Field Station there is probably the highest regularly inhabited dwelling in Britain. Where trees once grew and wild cattle ranged up to some 2300 feet, centuries of overgrazing and overburning have denuded the tree-cover and degraded the vegetation. The Conservancy is conducting experiments (illustrated here) aimed not to preserve rare plants or animals but to restore vegetation for the improvement of grazing, the checking of erosion and the formation of a natural 'sponge' to even out the flow of rivers and thus reduce or prevent flooding further downstream

Robert M. Ada

A 3000-foot peak in the Beinn Eighe Nature Reserve, Ross-shire. "The quartzite mountains are rapidly eroding but the high plateau below them holds some interesting examples of Scottish mountain heaths." The Scots pines on the lower slopes are a remnant of the old Caledonian Forest

history can be so plainly traced and because it is one of the very few virgin woodlands in England, although actually younger than a great many plantations. Both lovers of the picturesque and ecologists would instantly recognize this as a first-class Nature Reserve, but for totally different reasons. To one it is a romantic wilderness; to the other it is a heaven-sent demonstration of ecological succession and of the evolution of soils and plant communities.

Many low-lying parts of Britain were under the sea in the more or less distant past and the great fenlands east of Cambridge and Peterborough were among the latest to emerge. Even now the Woodwalton Fen Nature Reserve, some twenty-five miles from the sea, is in parts only a few inches above sea-level. After forty years of management with a minimum of intervention, the Nature Conservancy took over this Nature Reserve some five years ago and instituted a thorough control of water-levels, which enabled the water-table to be raised and encouraged rare plants, some long believed extinct, to begin recolonizing. Meanwhile, however, much of the fen had been covered by dense and uninteresting scrub, and the reversal of the ecological succession to open fenland is having to be effected artificially, since it would take much too long to drown the encroaching trees and bushes with the limited water-supplies available. This fen has always been of interest, particularly to entomologists, but the particular food-plants and conditions responsible for the presence of most of the rare insects remain to be ascertained. It is, however, already clear that bringing and keeping enough water on the fen is the decisive factor in enabling the still fairly rich remnants of a primitive fenland fauna and flora to keep their foothold. At the same time, the fantastic absorptive capacity of the fen has proved a great relief to neighbouring farmland in times of flood.

In a rather different way water is an equally dominating influence for the Scottish mountain Reserves, of which Beinn Eighe in Ross-shire is characteristic. The 3000-foot peaks are near enough to the west coast to catch more than their fair share of the Atlantic rain-clouds. Annual rainfall in the higher parts of the Reserve probably exceeds 100 inches, and the average annual temperature is somewhere in the neighbourhood of 38° Fahrenheit. The quartzite mountains are rapidly eroding but the high plateau below them holds some of the most interesting examples of Scottish mountain heaths with much recumbent juniper. On the lower slopes is a rather sorry relic of the old Caledonian Forest, devastated by successive wartime felling and fires, but still sufficiently natural to permit valuable studies of the conditions of growth of Scots pine forest near the oceanic limit of its range. Pine-martens inhabit this wilderness and their food and wanderings are being patiently studied. Unfortunately Golden Eagles, which occur frequently in other Scottish Nature Reserves such as Rhum, are rarely seen here at present.

Beinn Eighe is one of the Reserves on which Red Deer are being specially studied in connection with the long-term measures for their conservation and control under a Red Deer Commission, including representatives of the Nature Conservancy, which is a subject of legislation in the present Parliamentary session. The general principle is to discover the maximum densities at which deer can live on various different types of habitat without becoming a nuisance to forestry or agriculture and without overgrazing or deteriorating their own stock. At the same time the fearful cruelties of indiscriminate night-poaching, for which Beinn Eighe has been notorious, will be heavily penalized. The Beinn Eighe Warden, Mr James Polson, who has been very prominent in the struggle against poaching, recently received the British Empire Medal.

Where it is necessary to undertake fencing for scientific or conservation purposes on such difficult terrain, exceptional obstacles have to be overcome, and in one case a helicopter had to be used to transport material to a lofty and inaccessible site.

The highest centre of research run by the Nature Conservancy, or indeed by anyone in Britain, is the Moor House Field Station on the Westmorland Pennines at just over 1800 feet. The climate here, which has been studied for many years, is authoritatively described as resembling that at sea-level in Iceland. At the Reserve's highest point on Great Dun Fell (2780 feet) the average temperature is below freezing for four months of the year, from December until March inclusive, and the year-round average is less than six degrees above freezing-point. At Moor House itself the temperatures are between three and four degrees warmer.

In this hard environment the scientists work all the year round recording full details of the climate and stream-flow, and the success or otherwise achieved in many experiments, such as those aiming to grow trees and other vegetation at high altitudes and to check erosion and the degradation of the habitat, which has been going on at an accelerating pace for many years. Much of this deterioration is traceable to unwise practices of burning and grazing. It is no accident that floods are becoming an increasing menace and have three times recently cut the main-line railways between England and Scotland. They occur when heavy summer rains fall on catchments no longer able to intercept and hold enough water to avert excessive rates of run-off.

It will be seen from these few examples that the British Nature Reserves are the focus of intense and well-coordinated team-work by many different types of scientists. The purpose of this team-work is to advance knowledge of natural processes; it is not specifically planned to increase production or to be of direct economic value. Nevertheless, experience already shows that by such a well-directed and carefully executed attack on our ignorance regarding the workings of Nature, much knowledge is gained and disseminated which has a vital bearing on the wise use and management of our land as a trust for future generations. If we want to know how to make the most of the nutrients in the soil and how to conserve and improve the soil itself, we cannot do better than enquire into the natural processes which so far have been responsible for the production of practically every cubic foot of fertile soil in existence on this earth. Similarly, if we wish to control animal or plant populations we might do worse than to find out how they are regulated in natural conditions, in which pests and plagues are exceptional occurrences. The acreage set aside for Nature Reserves and the resources voted to Nature Conservation will undoubtedly pay a worthwhile practical and economic dividend over the years, quite apart from the service which they perform to science and to our civilization. Many types of wild country are rapidly dwindling under pressure of increasing population and rising requirements in support of improved standards of living. To save the most characteristic of these beautiful and interesting places at such a time is a service of incalculable value.

Underwater Adventure in Apollonia

by NICHOLAS FLEMMING

Last August and September a Cambridge University Expedition led by the author, comprising ten people of whom all but one were undergraduates, explored and surveyed the sunken city of Apollonia in Libya. The Expedition was supported by the Royal Geographical Society and the British School of Archaeology at Athens and received a grant from The Geographical Magazine *Trust Fund*

I SAT in the café by the dock-side in Syracuse, tapping my fingers nervously on the bare table and looking out at the thick, green harbour waters. The ship would sail in a few hours, and Richard Everington was still missing. He had been climbing in Austria, and we should have met him in Pisa, but somehow we had missed him and he had been left to follow us to Sicily on his motor-scooter. I looked to where the dark fishermen sat on the kerb mending their nets, and then at the solid, painted boats, with their thick masts and heavy tarred rigging. Across the square I could see the small bus which we had driven from England, parked carefully in the only patch of shade, and a crowd of people gathered round it. There seemed to be some trouble. I stood up, feeling that nothing more could go wrong, and ran to see what had happened. Everybody was talking and waving their hands about, and in the middle of it all was Richard. He was still sitting astride his grimy scooter, his long legs stretched out on either side, his jeans dusty and oily, his singlet sweat-soaked, and his face stubbly and copper-tanned by the steady wind and sun. He grinned wearily and twisted the grips on the handlebars as he told his story.

"I got into Pisa at about eight-thirty in the evening, and you weren't there . . ."

"Oh, hell, we waited all day, and only left at eight."

"Well, I thought I'd be able to catch you up, and I drove pretty hard, but no luck."

"That's not surprising. That was the night we took it in turns to drive all night so as to get into Naples early."

"Yes, I got your message at Naples, but set off a bit late, and still couldn't catch you. Where did you sleep last night?"

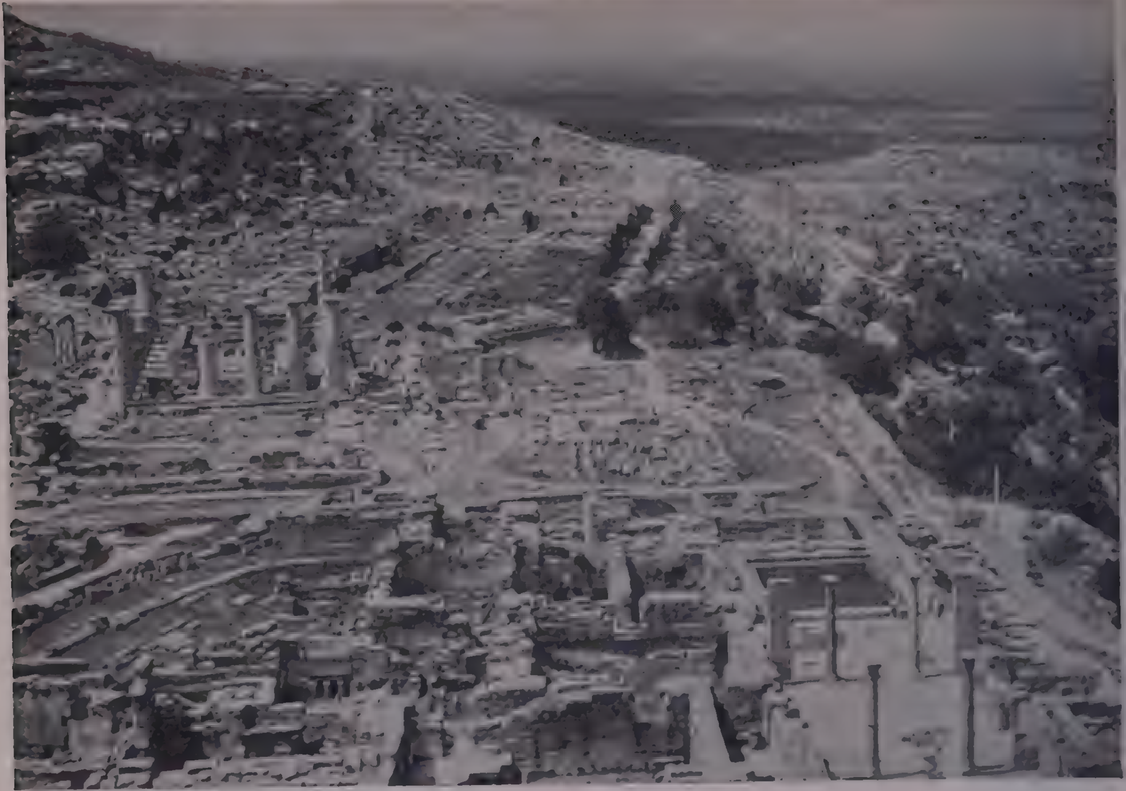
"In the hills just outside Messina. It was very funny; we all slept with loaded harpoon-guns beside us because we had been told there were bandits."

I slept just over the straits, near Reggio, and crossed the ferry this morning. I must have been only a few hours behind you all the way."

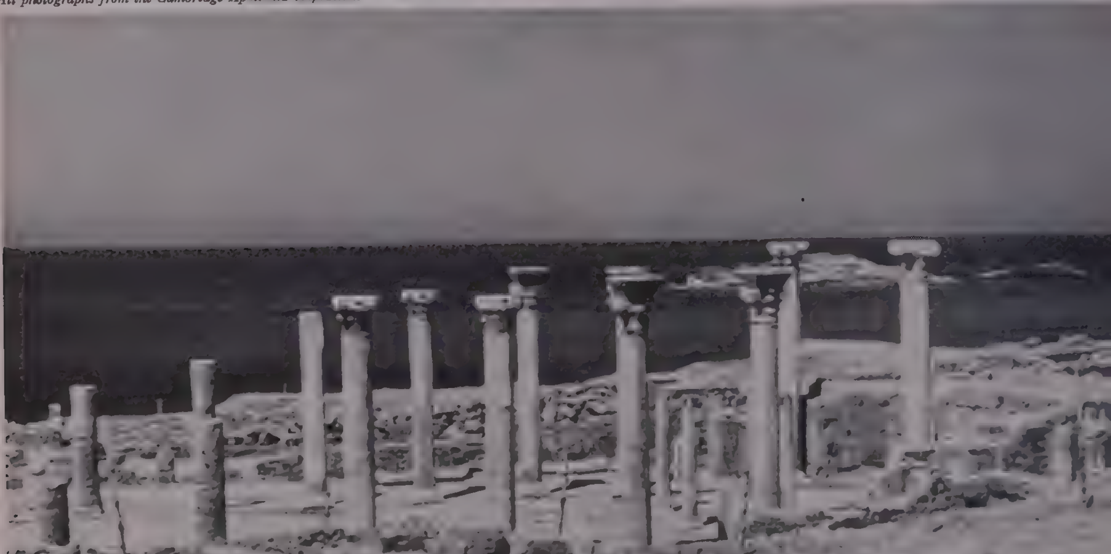
We all agreed and after a happy, yarn-swapping evening meal, we boarded the *Città di Livorno* bound for Malta and Benghazi. The party now consisted of Dr Adrian, Bill Hemmings, Richard Windred, Richard Everington, Martin Minns, Nick Wood and myself. Dave Fagan, Natalie Pater and Dick Longbottom were following by train and would cross on the next boat.

We arrived in Benghazi on the morning of the third day, with a strong onshore wind making a choppy sea. The breakers over the harbour walls, the haze over the dull-coloured city and the apparent lack of life combined to give an uninspiring impression, but there was a suggestion of hidden strangeness. A gang of red-hatted Arabs and Negroes gathered on the quay as we came alongside, and they unloaded our equipment onto a donkey-cart. We trekked across the dusty cobbles to the Customs office, where a smart Negro officer chalked our baggage, and then out through the wire gates into the town. We loaded everything onto a hired bus, refreshed ourselves at a hotel, and then drove eastwards for Apollonia.

The main streets of Benghazi are lined with large European buildings, many built by the Italians, and the roads are wide and full of cars. At each main crossing dark, slender policemen, in immaculate uniform, direct the traffic with a grace very unlike the heaviness of a London policeman. We drove out of the centre of the town, and the Arab driver surreptitiously kicked off his shoes and curled his toes lovingly round the pedals. On our left, between the road and the sea, was a large grove of palm-trees, and leaning round their trunks was a shanty town of corrugated



All photographs from the Cambridge Apollonia Expedition



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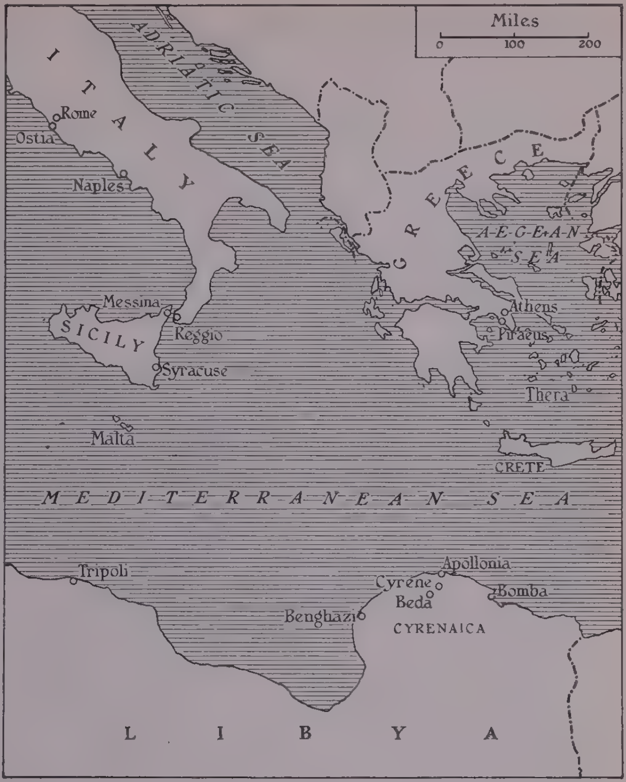
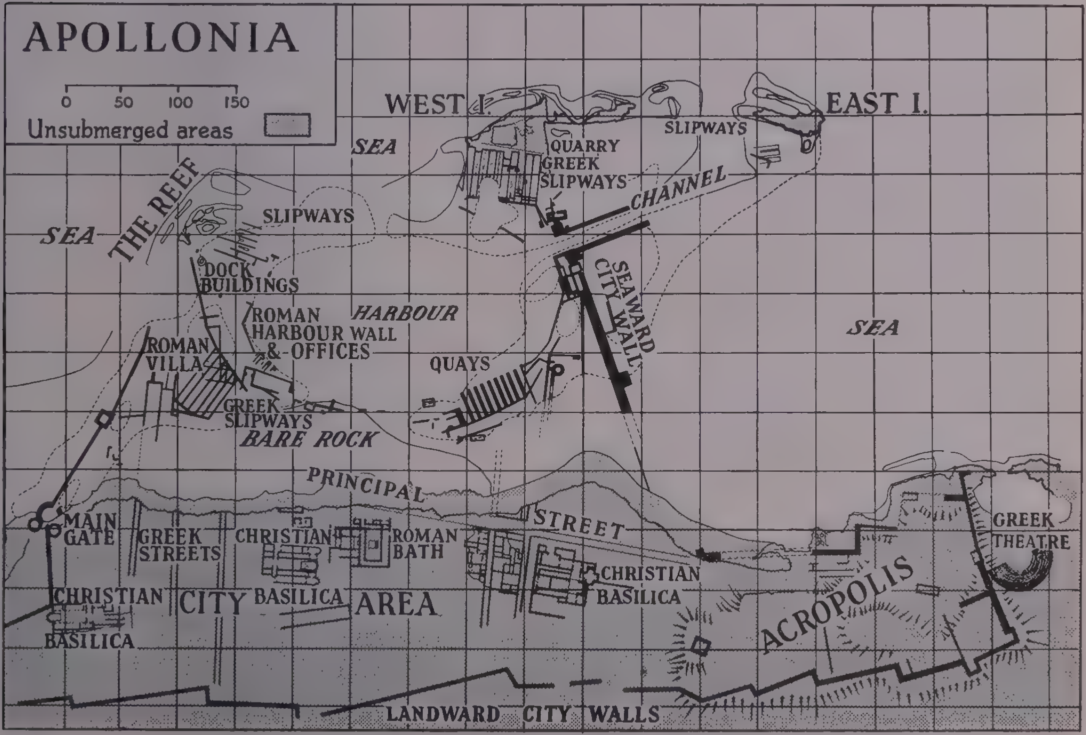
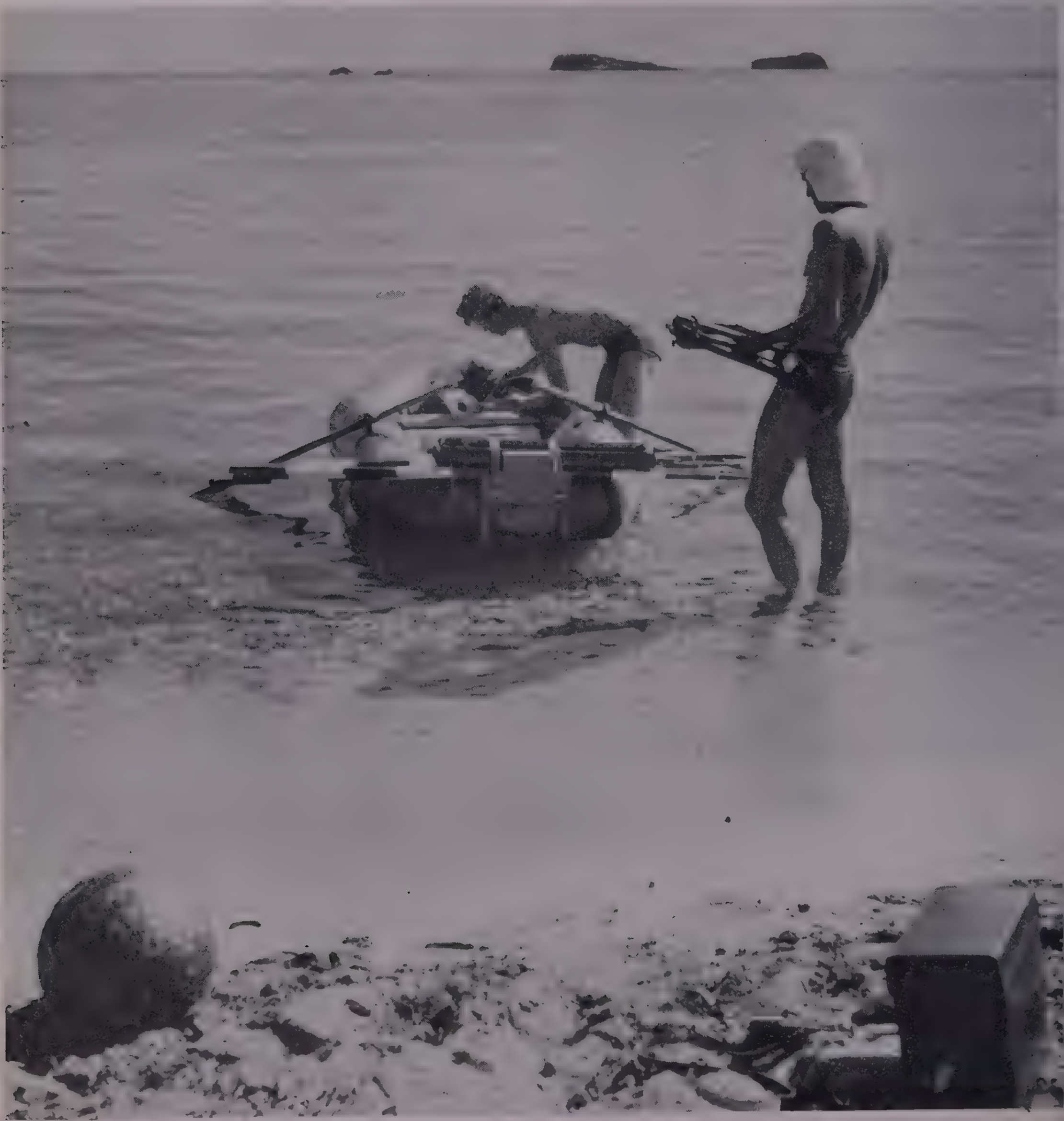
(Opposite, top) *Cyrene, ancient capital of Cyrenaica and one of the greatest Greek colonies, was founded in the 7th century B.C. On the left are the remains of the Temple of Apollo and at the bottom right those of an extensive Roman bath, for Cyrene became Roman in 96 B.C. Cyrene is ten miles from the coast and its port was Apollonia where* (opposite, bottom) *columns of the easternmost of three Christian basilicas indicate a city that was still active in the 6th century A.D. The island in the background marks the former seaward limit of Apollonia, part of which has been submerged under the sea.* (Right) *A map showing the relationship of Apollonia and Cyrene to Athens and Rome.* (Below) *The plan made by the Cambridge University Expedition. The northern part of Apollonia lies in the sea, the southern part on shore. Entrance to the harbour was between the islands. The dotted lines enclose large areas of rubble from destroyed buildings, while the uppermost line running round the city shows the former coastline*

A. J. Thornton





The Cambridge University Expedition to Apollonia found that the area to be surveyed was so large that, especially since most of the work was of necessity under water, it could not all be done accurately from the shore, so subsidiary base-points were set up on the islands. On the stern of the dinghy are the ranging-poles and tripods, and in the bottom go the aqualungs, plane-table, alidade and cameras. The copper ball in the foreground was used as a float to give the underwater camera buoyancy and stability. The entrance to the ancient harbour is in direct line from the observer to the gap between the two islands, and the two small rocks visible on the left mark the top of the reef and part of Apollonia's city-wall



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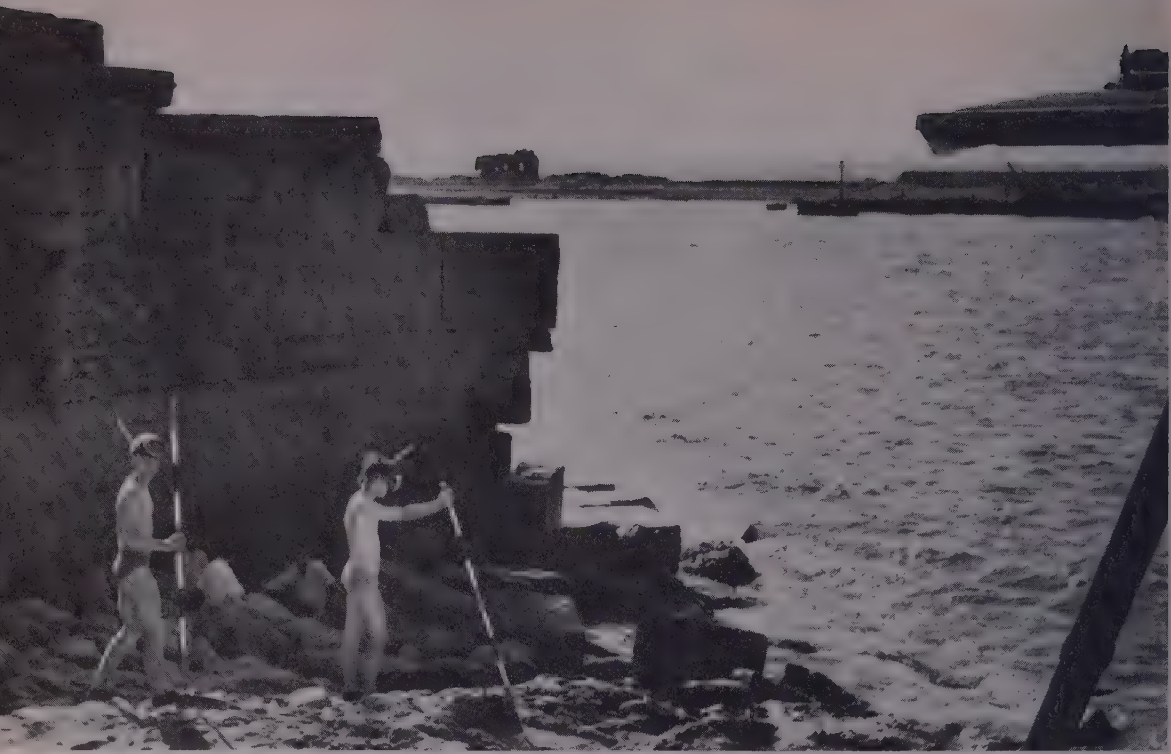
In the survey of Apollonia one end of the base-line was by the Main Gate to the west of the city. Here the author checks a rough sketch with two other members of the expedition before the accurate survey begins. The swimmers carry a plastic sketch-board; a duplicate is kept at the plane-table

iron and cardboard. Children rolled and played in the sand, and goats, donkeys and chickens wandered onto the road. We passed Rommel's pool, Mussolini's arch, and came finally out onto the coastal plain, heading for the mountains of the Jebel Akhdar. We wound our way up the hairpin bends into the grey wadi at the foot of the hills, and rose slowly above the plain until we could see far along the coastline behind us. Ahead, we drove over ridge after ridge of grey and yellow stones, dotted with thorns and shrubs. We plunged down into Wadi el Kuf, its sheer walls pocked with prehistoric cave-dwellings, and at the bottom found a Bailey bridge and a police check-point. They looked suspiciously at our bomb-like aqualungs, but raised the gate for us, and we trundled clattering over the wooden slat roadway to the other side.

On either side of the road, for the whole length from Benghazi to Cyrene, we passed bungalow farm-houses built by the Italians and now inhabited by the Arabs and their animals, but there was no cultivation of the land. As we approached the high plains round Cyrene the land became more fertile and there were more people and animals on the roads. We passed a big construction-site where a new capital city is being built at Beda, and reached the remote cross-roads where we turned north for Cyrene. All around us were broken walls and carved stones sticking up from the rough shrubbery, and this ancient suburban sprawl continued for over a mile. In the evening light we drove towards the dark trees of Cyrene silhouetted on the edge of the Jebel. We glided down the avenues of whispering eucalyptus-trees, and



Two members of the expedition about to enter the sea alongside a tower of the Main Gate at Apollonia, equipped with ranging-poles for a survey of a submerged Roman villa. Sitting under water, they held the poles protruding above the surface, for a triangulation to be made from the shore

saw the columns of temples sloping up from the road on both sides. Arabs sat at tables outside the shops in the only street of the town, drinking coffee from tiny cups. We heard the distorted wail of Arab music from a barside radio; then we were out of the town on the other side. Below us was the centre of the ancient city and the road was lined with tombs and burial-houses. The road curved down past the shadowy doors until we crossed the last ridge, and there before us, on the narrow coastal strip, was Apollonia, a small cluster of white houses and a mosque around a square of palm-trees. An angular promontory jutted out into the sea and beside it were two rocky quarried islands, red and deep-shadowed in the setting sun. We idled down the last slopes into the square and unloaded our gear outside our lodgings. The driver smiled as we tipped him, wished us luck, and drove off to visit some friends.

After a good meal, I wandered out towards the ruins to get the lie of the land. The sun had set long ago, but there was a bright moon and I easily followed the path. Though the wind had dropped, the rollers still came in, and the black hulks of the islands were riding a sea of white. I walked along the low bank above the beach and saw how the walls broke off into the sand and surf. There were the columns of the eastern basilica, two rows of smooth marble columns, spaced on a mosaic floor. I stopped walking, looked out again at the lines of breakers sweeping in over the submerged city, and thought over the story of Apollonia. Herodotus recounts how Battus and Grinus set sail from the island of Thera to found a colony in Africa, because the Delphic oracle had told Battus that his stammer would be cured if he was successful. After many adventures on Thera and Crete, and one unsuccessful attempt, they landed at Bomba and founded the city of Cyrene in 635 B.C. Because Cyrene was ten miles inland, they built a great harbour at Apollonia to give them access to the outside world. In 91 B.C. Cyrenaica became part of the Roman Empire, and the rich grain-produce was exported to Rome via Apollonia and Ostia, the port of Rome. We visited Ostia while in Italy, and so completed the grain-route from the irrigated fields of Cyrenaica to the busy

(Above) *The author, wearing a thick woollen sweater, swims with the cine-camera over the city wall.*
(Below) *Martin Minns, on the right, has been measuring the width of the harbour-entrance with a reel strapped to his chest. The author, who has been filming the operation, helps him to rewind the line*

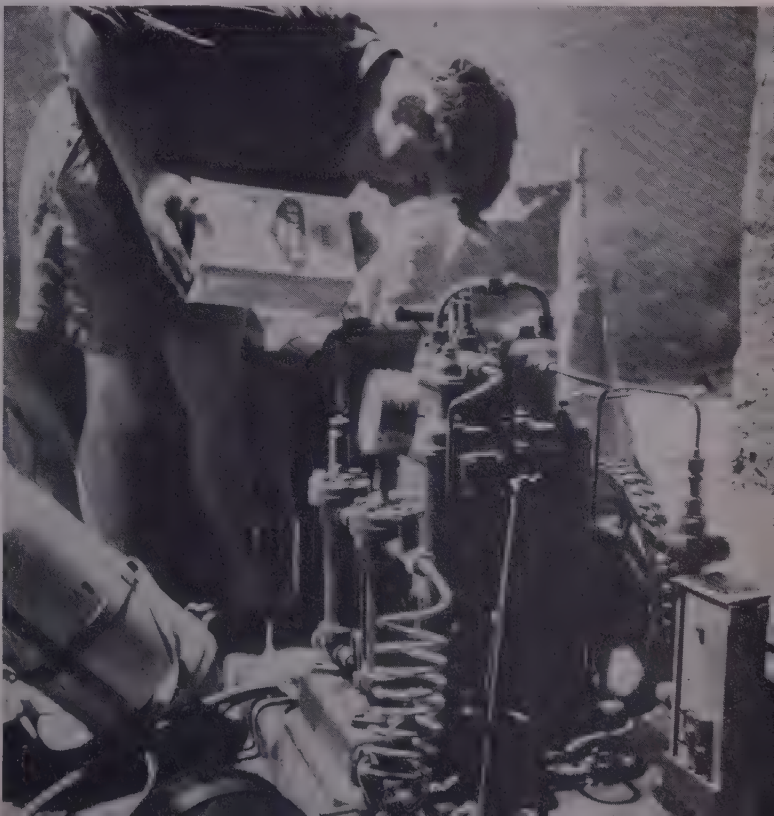
Standing at the head of one of the Greek slipways on West Island which used to form part of Apollonia, Hemmings holds up a twenty-five-pound merou that he has just speared. These big fish were everywhere among the ruins; they like to lie in holes in rock and so find the fallen masonry an ideal retreat streets of Rome. In A.D. 115 the Jews in North Africa rebelled against the Romans and the grain-trade lapsed. Now half of the great seaport lay under water, and no-one alive knew why and when it had sunk, or what it had looked like. I watched an old Arab driving his goats through the half-darkness back to the village, skipping from block to block as they made a hundred different paths across the Roman bath-house.

Next morning we were up early and tidied and checked the stores before breakfast. After breakfast, Nick Wood and Dr Adrian went out to find the best position for the base-line for the survey, Richard Windred and I started the air-compressor, while the others were swimming over the site with masks, fins, snorkels and plastic sketching-boards. Richard and I soon followed them. At first we could only find disconnected walls, scattered rubble and broken amphorae, but we came across the larger buildings after a while, and learnt to recognize our position in relation to these. The sea was calming down; we could cruise effortlessly through the warm clear water, following the green weed-grown lines of walls, checking and rechecking corners and alignments, until each building was accurately drawn. The largest and best-preserved buildings were in the shelter of the islands, and here we found walls and towers reaching almost to the surface, so that the water fell in clouds of champagne-bubbles as the waves faltered and broke over the square stones. We gave names to the biggest buildings which reflected how they were found, who found them, or some peculiarity of their construction or position. Among them were "Bill's House", "Tyre House", "Six Line Grid", "Prong Building", "West Island Slipways", and "Basilica Quays".

The reef to the west of the city, where we could see the entrance to a tunnel, was so exposed that the waves around it were very dangerous, and we were not able to swim near. Also, the water was so full of bubbles that it was difficult to see much, and sharp rocks would suddenly loom up in front of one. It was like driving in heavy traffic in a fog, with the disadvantage that the road kept rushing backwards and forwards as well. In every hollow we found explosive shells which had drifted inshore from a wrecked ammunition-ship. When Dick Longbottom carried one triumphantly out of the water to show us and we told him what it was, he dropped it with horror! In three days we had familiarized ourselves with most of the city and the base-line had been set up on shore. The line was 800 metres long and marked every 50 metres. It started by the Main Gate in the west and finished by the Greek theatre in the east; and when it was completed we were ready to start the accurate survey.

Every morning we collected our kit and walked through the village to the beach, clad only in swimming-trunks. Bill Hemmings and Richard Everington took aqualungs and underwater cameras, Nick took the alidade and plane-table, while the rest of us carried swimming-gear, plastic sheets, ranging-poles and tripods. This procession caused much amusement, and we were always accompanied by Arab children who called us all "Johnny". They often helped us to carry things, and

A three-stage compressor was used by the Cambridge University Expedition to Apollonia for refilling the cylinders of the aqualungs. In the centre are the two cylindrical cleaning columns, which purify the air after it has been compressed



loved to sell Roman coins in exchange for cigarettes. Every morning we passed the same donkeys, camels, and chickens scratching and rolling in the thick red dust. On arrival at the day's site, Nick set up the plane-table, and Martin, Richard Windred and I swam out to sea with the ranging-poles. Using copies of the preliminary drawings, it was easy for the swimmers to position themselves over twenty or thirty points in turn, while Nick took the bearings and signalled when he was ready for us to move. It took two or three hours to fix thirty points in this way; and when Nick wanted to cool off in the water, somebody else would take a turn at the table. The children taught us to count in Arabic and how to say a few polite phrases, but we never got very far and we found it easier to talk to the students who often visited us, and who usually spoke excellent English. They were very interested in our work and we explained the principles of triangulation to them, which they easily understood; but what puzzled them was the fact that we should bother to do it at all. To people of a country which is struggling to make up for its lack of industrialization and general education it must be strange that we spend time and money on the problems of a dead civilization.

As the survey progressed and the map grew larger, we discovered more slipways, first by the reef and then by the East Island. We also found that the slipways on the West Island had buildings constructed right on top of them, which was very odd; and below the end of the slip was a large wall which would have completely prevented the entry of any ships. There were also the foundations of a house on top of the slipways in the south-west corner of the harbour; and there seemed to be two systems of buildings, one about twenty metres nearer the centre of the harbour than the other. We found several whole pots and jars embedded in the black earth below the sand; and, after a storm had shifted the sandbanks, we raised the arm of a large statue. We searched for hours for the rest of the body, but with no luck.

Every evening we discussed the progress of the work, and after a week we planned to extend our activities.

"How's the photography going?" I asked Bill Hemmings.

"Not bad at all. I've just developed the cassette of Plus-X that I shot this afternoon, and I reckon we can start on colour under water tomorrow."

"That's fine. How's the zoo?"

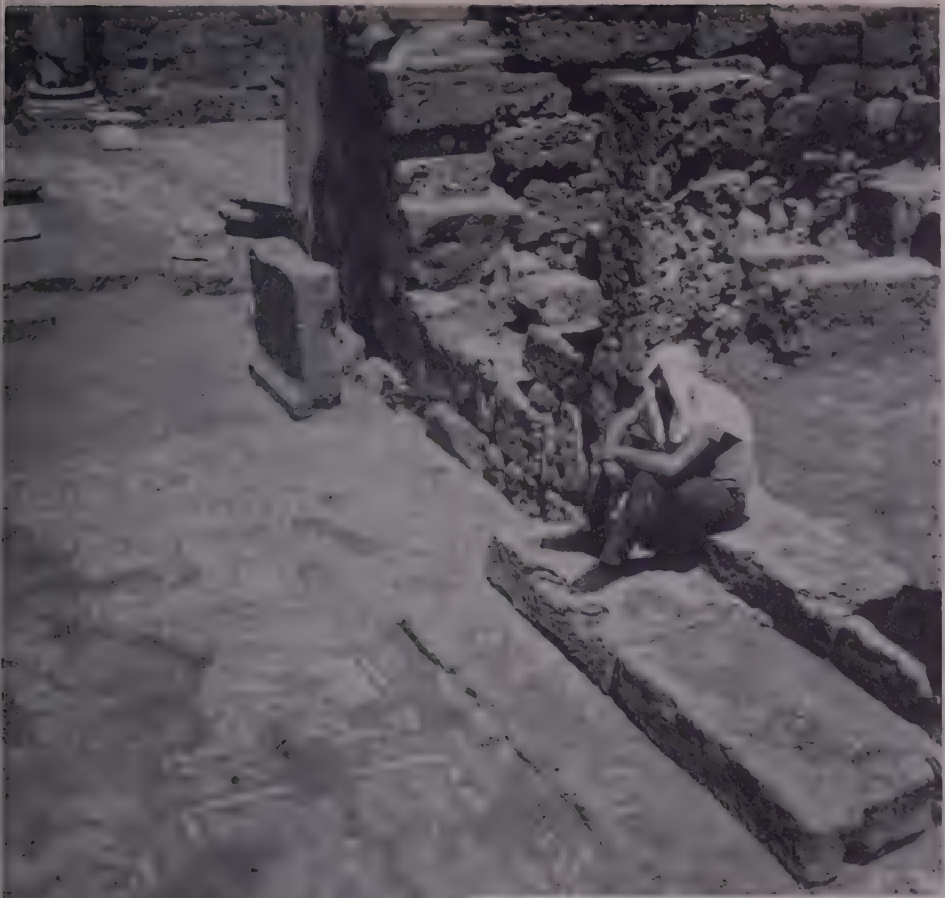
"I've caught quite a few specimens, but I haven't really got down to it yet. I want to do some night-diving as soon as possible, as there should be lots more life about then, and I can easily catch them if I've got the torch."

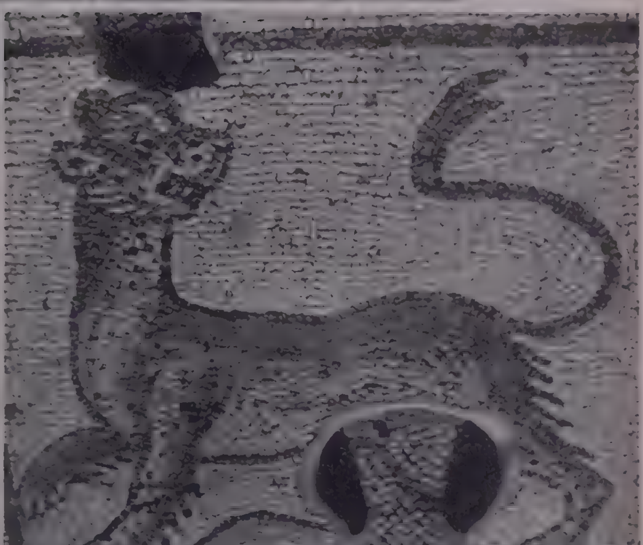
"O.K. That should be fun. Nick, what's happening in the drawing-office these days?"

"Well, I've moved everything down into one of the beach-huts, where I can get a bit of peace, and I've plotted all the points that we've done so far. It's beginning to look quite impressive, but there's still a lot of wall-thicknesses to be measured."

"Right, we'll start on that tomorrow. We'll also start on the filming. I think we can survey until eleven, and then film until one, so as to get the best light. The area between the towers of the harbour entrance is the best, and we can easily work from point C on the West Island, so we'll load the dinghy up first thing, and ship all the gear over there."

Next morning we all helped to carry the equipment down to the beach; and Nick, perched on top of the aqualungs, tripods, boards, poles and towels, rowed cautiously out to the island over the still water. His following of Arab children stood wide-eyed on the beach for some time, and then ran away to find other amusement. Dave, Dick, Martin, and Richard Windred swam after the boat and helped Nick with the surveying, while Bill and Natalie collected zoological specimens, and Richard Everington and I prepared the underwater cine-camera. Dr Adrian had by now become committed to running a surgery for the local population, and could not be with us in the mornings. By eleven the sun was burning down on the dead calm sea, and we gathered on the hot, rocky slopes of the West Island. We planned to shoot a film-series of the different stages of surveying around the towers, and we discussed the exact sequence of shots as we fitted our aqualungs. I swam out with the camera to look for the best angles, and pressed the lever for a split second to hear the comforting buzz of the motor inside its thick steel case. Then I settled gently down on a smooth rock, and breathed slowly while I waited for the action to start. Some wrass swam towards me, their mosaic colours shimmering in the green light, and I slowly brought the camera into position and shot a few feet of film. The divers were on their way, and the fun was soon fast and furious. There were six divers in the water in front of the camera, and Bill was gliding around the outskirts of the group taking still pictures. On either side of us the flanking towers rose up to the surface, and





(Above) *Mosaics in the easternmost of three Christian basilicas at Apollonia. Lacking shelter from the sun, a member of the Cambridge University Expedition has adopted the headgear worn by the Arabs.* (Right) *A close-up of one of the mosaic panels. There are several superimposed layers of mosaics; in this case a piece of a lower layer shows through. The upper one is early Christian, though many of the pictures contain pagan symbols, as was not uncommon in the early years of Christianity* the floor of our stage was carpeted with the building-stones quarried from the islands by the Greeks and Romans. While we were swimming in this mysterious and peaceful setting, we felt periodically the sharp clang and pressure-shock of underwater explosions. The Arab divers were blasting for scrap on a wreck, far out to sea.

As it was so calm, we swam over to the reef and filmed divers swimming through the rock-cut passage. The roof had fallen in in places, and the sunlight pierced the dark clarity of the water and glittered on the bubbles as they escaped from our lungs and twisted their way to the surface.

On later days we divided into groups so that some people would be measuring walls and block-sizes in detail, others filming, and some working on land. There was so much to do that we almost forgot we were in a foreign country, and had to relax and readjust our minds violently when we became trippers and tourists at the week-ends.

One morning I was finning luxuriously over an interesting area of superimposed foundations dating from different periods, when I saw a fisherman's rowing-boat about fifty yards away, and dark figures waving to me. I could not make out whether I was meant to approach or keep away, but as I guessed that they were bombing fish, I thought I would rather be in their boat when the big bang came than anywhere in the water at all. So I swam towards them and climbed into the stern of the boat. Richard Windred was already sitting on the bottom boards, and he looked at me mysteriously, but said nothing. A tall, handsome, one-legged Negro stood amidships, handling the oars, with his stump-leg propped on the thwart. In the bows sat two Arabs, gazing into the water. The first wore only trunks and was still wet and shiny. He gripped a glass-bottomed bucket with his good hand, while the other, which had three fingers missing, was curled painfully on the side of the boat. His friend held a home-made bomb, constructed out of sardine-tins and the explosive from shells, and he too had the fingers of one hand missing. The whole crew seemed very happy, and the big Negro smiled at us as he turned the boat this way and that, but nobody talked as they waited for the fish. There was a long, slow swell coming into the bay, and the boat rose and fell silently, rocked occasionally by the gentle movement of the oars. They could find no fish, so we thanked them for considering our safety, and they smiled again as we slipped back into the water.

As the map grew, we began to theorize about how the city reached its present state. The West Island slipways were Greek, both because of their similarity to those at Piraeus, and because the Romans did not use this kind of slip. Thus they were built in the earliest period of the city's history, and should indicate the water-level at that time. If boats are to be pulled up a slip, the water must be deep enough at the bottom for the keels to rest on the slip, and it must be long enough for the boats to be dragged high and dry. From the dimensions and slope we calculated that the water-level had risen by just over six feet.

Even with the lower water-level, there would still be a depth of a few feet in the gap between the West Island and the reef. Since the prevailing wind is from the north-north-west and there is often a heavy sea from that direction, the harbour would be almost useless unless the gap was blocked up. This has in fact been done at other Greek harbours, and it seems very likely that there was a large dyke or mole connecting the reef and the island, especially as we found large quantities of rubble in this area, when every tendency of wave-action was to sweep it away from there. To account for the buildings over and beyond the foot of the slipways, and for the inner ring of buildings, it seems necessary to suppose that the water-level dropped at some time, and this might have coincided with the artificial deepening of the channel between the islands. It is likely that the lowering of the water occurred, or became serious, during the Roman period, since the buildings on top of the slips are of Roman style. As the basilicas on shore are of the 6th century A.D., it is probable that the city was flourishing till then, and subsided soon afterwards.

Less certainty appears when one seeks to collate the facts ascertained and mapped by our survey with the long-term changes that are believed to have taken place in the levels of land and sea. There is geological evidence to show how land-movement *could* have occurred, but even more to show that it probably did not, at least not in historic times. The sea-level, on the other hand, has been rising fairly consistently for the last few thousand years, due to the melting of the ice-caps, and it has been shown to have fluctuated slightly during the same period. Possibly, therefore, the changes in level at Apollonia could be entirely accounted for by the movement of the sea. Among these uncertainties we have at least provided solid material for archaeological debate as to exactly what did happen to Apollonia.

Two Spas Meet: Sochi and Cheltenham

by F. D. LITTLEWOOD

Mr Littlewood is Town Clerk of Cheltenham. Our June 1957 number contained two articles giving further information about the Soviet Union's Black Sea resorts and the kind of people who go there

Shading his eyes from the mid-morning glare of the September sun, F. M. Zorin smiled and spoke to a young woman assistant as she stood on a ladder against the dark green foliage of a tree some fifteen feet high. "We are putting your graft next to that of Paul Robeson!" he exclaimed through an interpreter as with all the pride of foreman gardener of the Fruit Experimental Station in Sochi, U.S.S.R., he turned to Charles Irving, Mayor of Cheltenham.

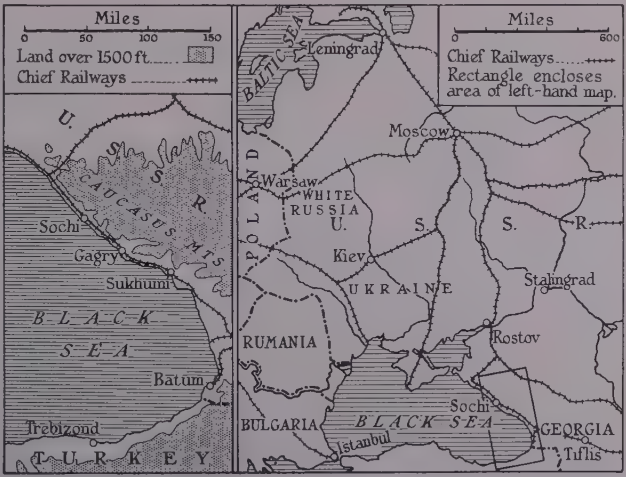
The two stood side by side in front of the "Tree of Peace" for which, under the gardener's supervision, the Mayor had just cut "a little eye" from a twig of a new kind of mandarine. Gathered round them was a small party which included the three other members of the delegation from Cheltenham, Aldermen Alfred Mann, Harry Midwinter and myself, together with our hosts, A. H. Churkin and S. G. Pletnev, Chairman and Deputy Chairman respectively of the Sochi Town Council.

"Now that's funny," said the Mayor, the interpreter catching the Mayor's surprised idiom quite happily, "for Paul Robeson is going to be one of the first visitors I shall greet when we get back to Cheltenham. He's the guest of honour at our Literary Festival luncheon; I'm taking the chair and he will be sitting beside me!" Zorin tilted his grey-blue peaked cap back on his head, his tough bronzed features wrinkling up with pleasure, the coincidence in no way putting him out of his stride. "Then you will surely talk of Sochi and our fruit-gardens, and of our 'Tree of Peace'." Now and again one comes across a face that lives in the memory. This was one; it could belong to nobody except a man passionately devoted to his work.

My turn came and Zorin handed me the pruning-knife. Some of the hours spent in budding roses in my garden at home gave my performance just that touch of experience. His grunt of satisfaction brought me a sense of pleasure that was a reward for many a back-ache.

Then in a few gruff words to our little gathering, now surrounded by onlookers and by children who had so delightfully welcomed us to the garden with flowers and charming little speeches in English, Zorin emphasized to us " . . . on this one tree—this 'Tree of Peace'—we have growing no less than forty-seven different varieties!" Zorin now led us off to a bower of banana trees where on a wooden table surrounded by newly painted benches and heaped on dishes were countless varieties of sub-tropical grapes, plums, pears and figs—all carefully chosen and labelled.

Here we sat down with our Russian friends—courtesy demanding that we should take a calculated risk with the fresh paint—and



A. J. Thornton

photographs from the author

Last summer a Civic delegation from Cheltenham, Gloucestershire, visited the Black Sea spa of Sochi. (Above) *The Chairman of the Sochi Council and the Mayor of Cheltenham* (*wearing chain*) *drink a toast in spa water before the Sanatorium of the Coal Industry.* (Below) *Sun-bathers on the crowded beach*

(Above) *The Cheltenham party chatted with visitors from all parts of Russia as they strolled along the Sochi promenade and beaches.* (Below) *In Sochi's experimental fruit-garden the Town Clerk of Cheltenham tries his hand at grafting a shoot onto the "Tree of Peace" under the guidance of the head gardener*

sampled the fruit. The Chairman of the Sochi Council turned to our Mayor as we extolled the choice flavours and said: "It makes us happy to hear you speak in this kind way, dear guests, because we are so pleased to have the friendly tie with Cheltenham, the Garden Town of England!" "But, Mr Churkin, we have no fruit like this," remarked the Mayor. "Ah yes, but you have beautiful flowers. I know, because I saw the wonderful display at your Mayor-making ceremony," replied the massive and amiable Deputy Chairman, S. G. Pletnev. These remarks took my thoughts back to why, in this sub-tropical fruit-garden, the Mayor of Cheltenham accompanied by two Aldermen and the Town Clerk were so much enjoying a rest in an otherwise intensive programme, and indeed why we were visiting the U.S.S.R. at all.

The story is really a simple one. For a number of years Cheltenham, with its background and present-day industries, has endeavoured to foster, on a non-political basis, an understanding with similar towns of other countries, and to exchange views and information about the way in which the different services required by the townspeople are administered.

In this manner, Cheltenham had already a close association with Cheltenham, Pennsylvania, with Göttingen, Lower Saxony, and with Annecy in the Haute-Savoie. Not only had Civic delegations been exchanged on a number of occasions, but more importantly, they had been preceded or followed by regular visits of youth groups and others, as well as by exchanges of various kinds, including the local papers, hand-books and brochures.

It was not surprising, therefore, that the Council should accept the principle of forming a friendly tie with Sochi, a town which the Soviet Embassy, who took part in arranging the link, described as "our famous spa on the Black Sea".

A principal courtyard in the Kremlin which the Cheltenham delegation visited during their tour. They are seen walking towards the Ouspensky Sobor (built in 1475), largest of the Kremlin churches

N. Bobrovnikov (right), Chairman of the Moscow Council, in his office, with the Mayor of Cheltenham. The Chairman explained the way the Moscow Council works and deals with day-to-day problems

This arrangement led to an event which must be quite exceptional in local government history, for when Charles Irving, who was primarily responsible for the new Civic link, was invited to continue as Mayor, not only was there present at our Mayor-making ceremony a delegation from Sochi, U.S.S.R., but our older friends in the shape of the Township Manager of Cheltenham, U.S.A., and the Oberbürgermeister of Göttingen. When our turn came to visit Sochi, therefore, we did so knowing that members of the Sochi Council had already visited Cheltenham and had spent some time in our town, visited us in our homes and seen something of how we lived, worked and managed our local government affairs.

We had, of course, taken the Sochi delegation to London, where they had been entertained at County Hall. They had lunch with the Lord Mayor of Birmingham and had a glimpse of other important cities and towns. In the same way, from the time we had been most warmly welcomed at Moscow Airport we felt that our hosts had really gone out of their way to show us as much as possible, in spite of some of our requests being understandably difficult. We certainly had some unusual experiences. We were told we were the first Civic delegation to go over Moscow's principal civilian prison, and we were able to talk to some of the 850 inmates and staff, to visit the cells, kitchens and prison hospital; we had spent the best part of an afternoon in a People's Court; we had jostled with ordinary people, had cheered the Dynamos and whistled disapproval at the Locomotives at Moscow stadium, and had seen a crowd of over 100,000 leave with hardly a vestige of litter; we'd taken shelter in the rain amongst a group of sightseers in the Kremlin, an occasion when an invitation from a miner and his wife to visit their home north of Khabarovsk in the Far East was pressed so hard and so sincerely that I felt the Mayor must surely accept; we had been to performances of opera and ballet, or to the theatre or cinema nearly every night; we had played simple games with complete strangers in Gorki Park; been over a motor-car and bicycle factory and other works; been to church with a service in progress; Alderman

Midwinter had laid a wreath on Lenin's tomb; the Mayor had bought a fur hat at the G.U.M. and competed with the customers in some of the smaller shops; we'd been shown over a monkey experimental station. . .

We had . . . surely I hadn't dozed off, I wasn't dreaming all this. But my thoughts were indeed abruptly interrupted by the Mayor . . . "When the Town Clerk has quite finished trifling with that pile of grapes, we shall be ready to move." No more was necessary! Our hosts knew we understood our little rest had come to an end, so, after stickily signing the visitors' book, off we went to tour another garden, to look at an open-air theatre and, later in the morning, to have one of the most exciting experiences of our visit when, with the Mayor wearing his chain, we walked down the steps and along the public beach. The hundreds of visitors to Sochi who were sun-bathing and strolling around suddenly realized our presence. They pressed round nearly overwhelming us with their numbers and amiable curiosity. It was as friendly and as informal as could be imagined. It surely could not have been organized in any way. Our party was eventually broken up, and we were individually surrounded by the smiling faces and bare bodies of the many who were anxious to talk and ask questions.

But our visit to the U.S.S.R. was not all fruit-gardens, theatres and beaches. We had come to learn and see as much as possible, particularly about local government. Our education in this regard, apart from what we had read and been told before our visit, really began in Moscow, where it had been arranged that we should call on N. Bobrovnikov, Chairman of the Moscow Council. This we did on the day following our arrival.

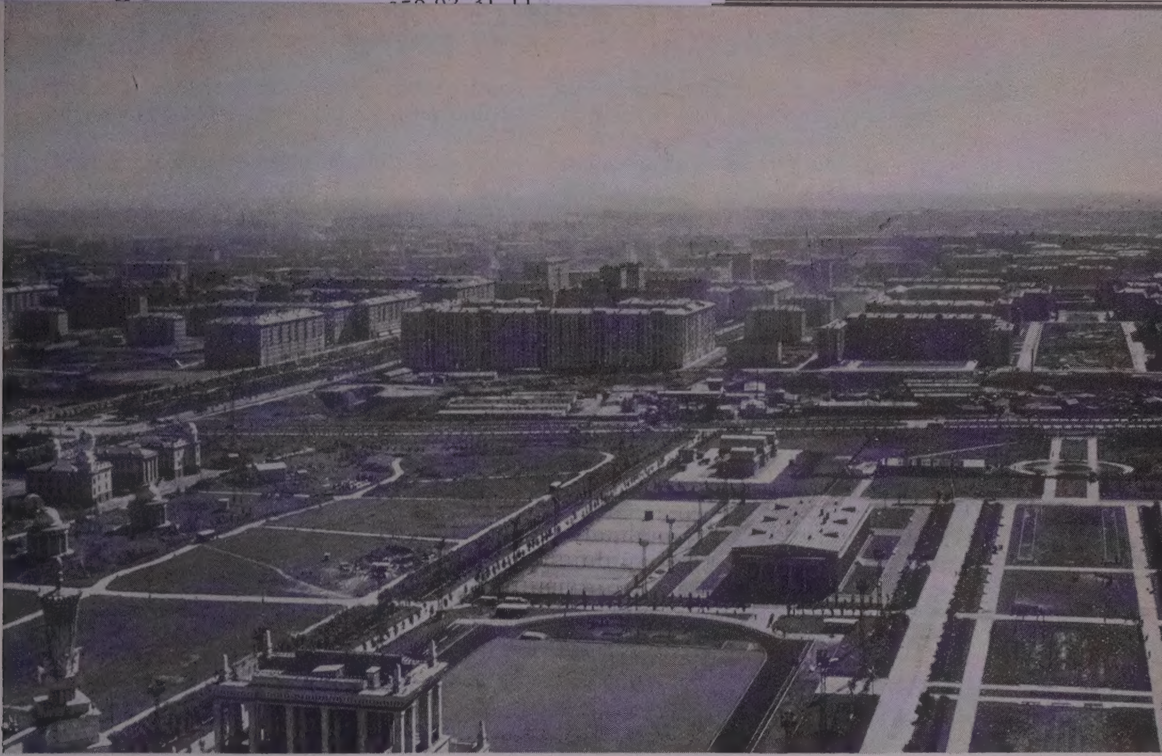
Mr Bobrovnikov, who was accompanied by half-a-dozen colleagues and officials, received us with warm and friendly courtesy in his pleasant and well-appointed office apartment. I noticed it had the same sort of uniform pink-shaded carpet that was in common use at the Sovietskaya Hotel where we were staying, and in the better rooms of other public buildings. The room otherwise lacked in some degree that curious Victorian atmosphere we found everywhere so very prevalent, even in the most recently constructed buildings.

Mr Bobrovnikov was most painstaking in the way in which he sought to answer our questions. We were told that the system of local government was the same throughout the Russian Federated Socialist Republic as it was in the other fourteen States of the Soviet Union. Indeed it appeared more of a system of government than local government, for each Town Council is responsible to a Regional Council or Soviet, called a Raion, which in turn is responsible to a similar Provincial body or Oblast. From these power and duty flowed from and to the Republic concerned and ultimately to the Supreme Soviet of the Union. We gathered something of the duties of various Ministries, of the autonomy of the different Republics (at any rate in theory), and learned that to some extent special arrangements were made in the case of Moscow and Leningrad.

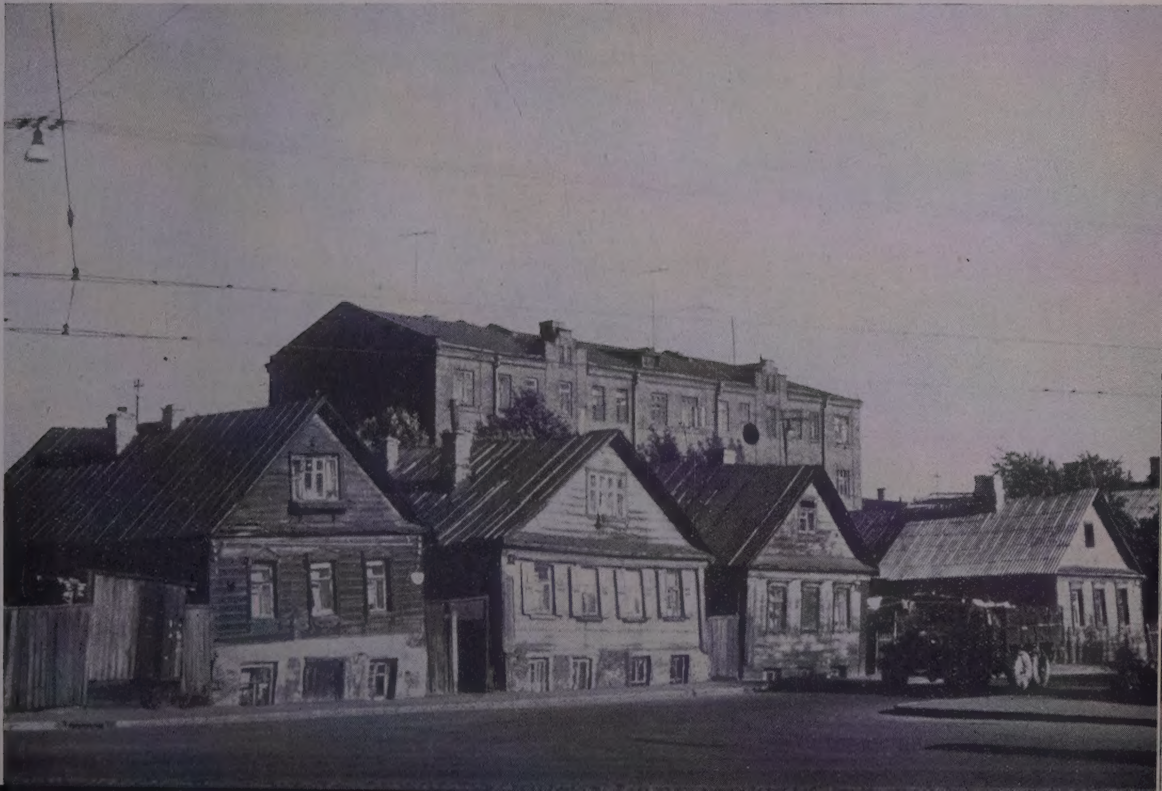
"How is your budget made up?" Alderman Mann, who is incidentally Chairman of the Cheltenham Finance Committee, wanted to know. "Do you have rates?" "No rates," replied Mr Bobrovnikov, who had visited England and was not unfamiliar with the term. "We do not levy any taxes either. About 80 per cent of our revenue comes from our undertakings, and we receive grants from the state which make up the other 20 per cent." "What then are the principal features of your budget?" pursued the Alderman, rather taken aback by the thought of a land with no rates. "Our main expenditures—by far the largest—are for new housing construction, health and education." "It is very much the same with us," interjected the Chairman of the Sochi Council, "only we have special problems as a resort and with our sanatoria." "I hope that while you are in Moscow", Mr Bobrovnikov went on, "you will see as much of our building-work as possible."

We took advantage of this offer not only in Moscow but also in Leningrad and Sochi.

With the advantage of having as interpreter V. Kuzin, an official of the External Affairs Department who had accompanied the Sochi delegation to Cheltenham and knew us and our town, we went round some of the building-sites where work was in progress. Everyone we talked to seemed completely confident that, now that the problem was really being tackled in earnest, the immense programme in Moscow of over 500,000 flats in the next five years would be achieved, and the large number of remaining wooden houses replaced. The more we saw of the building-work going on—so much of it, like the street-sweeping and other heavy manual work, done by women—we could not help feeling that this confidence was not misplaced. The plan is based on the building of massive and uniform blocks of one-, two-



The Cheltenham delegation were especially interested in the housing problem in Moscow and the drive to overcome it. (Above) *Some of the new blocks of flats, seen from the top of Moscow University tower.* (Below) *Old Muscovite houses, typical of the many overcrowded wooden buildings due to be cleared away*



and three-room flats arranged in four to five storeys, the most economic size, with prefabrication extensively used.

V. Kuzin pointed out some sky-scraper-type buildings of eight and more storeys, saying that they were put up in the early post-war period and attractive though they might be, they proved too expensive and would not be repeated. Whilst I was prepared to accept that the programme now under way would be achieved, it occurred to me, particularly when looking at the flat panorama of the city from the University tower, that though these heavy, regularly spaced blocks of flats contained badly needed housing-accommodation, Moscow, whose wide streets are already drained of colour except at its historic centre, might well become an even more drab city in the future.

The minimum standard for new housing-construction is below what we are accustomed to find even in the poorest places in Great Britain.

We found the Russians extremely proud of what had been attained in the way of improving the people's health, and certainly, to judge from the hospitals and clinics we went over, there have been many signal achievements in the establishment and extension of health services. We were particularly interested to find that every factory had a health post, and the larger ones fully equipped clinics, from which medical and nursing staff not only looked after the well-being of the workers, but that of their families also. To our embarrassment we were ushered into all sorts of wards without ceremony, and brought into close contact with patients undergoing treatment; though neither they nor the staff showed any sign of

Children outside Lenin School No. 2 in Sochi. The Mayor of Cheltenham and members of the delegation were greeted with speeches in English and red "Pioneer" scarves were tied round their necks

surprise. Another thing which I found disconcerting was that as about 80 per cent of the doctors in the U.S.S.R. are women, it was difficult at times to distinguish between them and the nurses.

We scarcely had more than a glimpse of the education services. After we had spent a considerable portion of the day going over Moscow University with its 2000 staff and over 23,000 students, and an output of science graduates that is quite staggering, we were told that if a child was born in one of the rooms of the central building, and spent one day of its life in each of the other rooms in this building, he would be 120 years old when he left—which we could well believe.

In a system of education which is free but compulsory the school years are from 7 to 17, with a possible break at 14 for change in type of school. We learned that the most critical moment in a young person's life was the University entrance examination. Problems, we were told, did arise over this test, and the utter and complete difference that success or failure meant to a person's whole existence was a shadow that darkened the minds of not a few young people. My thoughts went back to our own eleven-plus difficulties! One foreign language is compulsory, with English the most popular choice. At Lenin School No. 2 in Sochi we sat among the 10th Form during an English lesson. Several pupils (we were told they were volunteers!) read from a biography of Lomonosov in English. The work was written in a kind of Dickensian style; portions were first of all read in English, then translated into Russian and afterwards questions about the subject-matter were asked and answered in English. At the end of the short session, the Mayor was asked to help in allocating marks. When the woman teacher V. V. Kamanskaya said to Lyuda Titkova: "Your answers deserve 5 minus," the Mayor said: "Give her 5 plus", and his magnanimity was similarly extended to other pupils. The smiling faces of the class showed the same sort of pleasure as in an English school when a distinguished visitor has asked for a half-holiday.

In Sochi we also visited Kindergarten School No. 33 and saw and played with some of the hundred children, whose parents were all engaged on building-work. When we told the Head that we admired the way the school was run and the cheerfulness of the children, she said: "Well, children are children the world over." But we could not help noticing that the little playground was surrounded by vines upon which hung bunches of grapes, as far as we could see quite untouched; which implied a standard of behaviour that was uncannily high!

We struck the same sort of thing later when we went over the "Palace of Pioneers" at Leningrad. The Pioneers are a nation-wide youth organization which though not part of the educational system operates side by side with it. It is rather like a combination of Boy Scouts and Girl Guides and its members wear a red scarf round their necks as a uniform. Most pupils are proud to belong to the organization, of which, as our delegation had red scarves ceremoniously tied round our necks, we may be considered honorary members. We saw, out of school hours, boys and girls undertaking hobbies such as carpentry, sewing, model-making, drawing and chess in the tidy and orderly way that I had hitherto only seen on the quite unbelievable illustrated covers of children's books and boxes of toys. As we had the opportunity of joining the children in their songs and games, I can vouch that they were, within a proper degree, exuberant, but there was no sign of any damage or injury or marking of walls or furniture.

I look forward to seeing what results from the Mayor's proposal that, beginning in a small way, there shall be an exchange of teachers and young people between Cheltenham and Sochi.

Sochi is growing fast as a popular resort. It has no less than forty-eight sanatoria, fifteen of them in the course of construction. These institutions, which house from 200 to 800 people—and they seem to be continuously full—follow a general pattern: a hollow square with the missing side facing the sea, or, to put it more accurately, a main building with wings on two sides. They are situated and almost hidden in luxuriant ornamental gardens with tree-lined avenues, most of them having their own specially reserved beaches and also *dachas* or villas for the more distinguished visitors. The sanatoria have commodious public rooms and many single and double bed-sitting rooms. The buildings are of massive construction, and in architectural design look curiously like some of the mansions built in this country during the Georgian and Regency periods.

Apart from the treatment-rooms, which are well equipped in a utilitarian way, the furnishings even in the newest sanatoria have the background of marble, lace, plush and indoor plants that we associate with our own late Victorian period; whilst all chairs, settees, sofas and the like have white dust-covers. Everything is spotlessly clean.

Visitors and patients are sent to the san-

At Sochi in the evenings there were concerts at the sanatoria, when community singing, games and dancing took place. At one of them, the Pravda Sanatorium, the Town Clerk of Cheltenham danced the barynya*—gaining not only Mayoral approval but some encouraging applause from the onlookers!*

atoria by their place of work or by their trade union, though I was told it was possible to go on one's own savings or by a combination of the different methods. Each sanatorium is affiliated to some industry, town or place of work. Originally they were sponsored by the different trade unions, and though there have been some recent changes in administration, a close association still remains. One of the largest of the sanatoria is the Miners', while another, "The Golden Ear", is for agricultural workers; and to the most recent, "Sanatorium Metallurgy", the visitors come mainly from the metal industry.

But all this is not to say there isn't any fun in the sanatoria. In the evenings there are often films and concerts. On one occasion we went to a party at Sanatorium "New Sochi". A concert was being given by the staff of "Sanatorium Pravda", and sitting and standing round the central paved courtyard was a crowd of four or five hundred who gave us a most friendly and excited welcome. We joined in the songs and then the dancing—waltzes, fox-trots and tangos mainly. Then there was a pause, and two hostesses came across the cleared floor and asked the Mayor to dance the *barynya*. The Mayor, who had just sat down after an energetic fox-trot, motioned imperatively in my direction. I felt I could not let the challenge pass and so, to the surprise of all (especially the Mayor, I suspect) in the words of the local paper *Krasnoye Znamya* (Red Banner) the Town Clerk "to the accompaniment of the applause of all present, performed this Russian dance". I must say I enjoyed the applause a great deal, and in retrospect perhaps the dance also!

The magnificence of Russian hospitality is well known, and on all the occasions, and there were many, when we were feasted and entertained, there seemed to ring a note of genuine friendliness. When we took our leave of the Chairman of the Sochi Council with whom we had now confirmed our "friendly tie", we were quite sincere in saying that such an exchange of visits must be a beginning and that we hoped it would not be long before young people from Sochi would be visiting the gardens, factories and festivals of our home town. We hoped, too, that Zorin in the experimental fruit-garden at Sochi would be smiling as he handed his pruning-knife to a leader of some youth-group from Cheltenham.